

FINAL REPORT

I	The Name of the Institution to be evaluated	National Institute for Research - Development for Electrochemistry and Condensed Matter – INCEMC
II	Evaluation Period	4 :- 6 May, 2012
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C1 Quality of R&D activities and results

C1.1 Publications and patents

As pointed out above a large number of scientific topics are addressed by the Institute, in Chemistry, Electrochemistry, Physics, Biophysics, Bioanalysis etc., with both fundamental and applied character. Many topics are of high interest for today's scientific community. Some groups are more productive from the innovative and dissemination point of view (i.e. E4, E9). In the reporting period (2007-2012) the Institute presented a number of important papers, some of them in high impact journals as *Chemistry of Materials; J. Chromatogr A; Anal. Bioanal. Chem, J. Alloys and Compounds, J. Mater. Sci., J. Nanoparticle Research, New J. Chem, Anal. Chim. Acta* etc., some of which have attracted multiple citations. However, in the prospect of publications we need to consider the fact that Prof. Zamfir is not a full time employ of the INCDEMC and she has another research group at Timisoara Polytechnic University. Therefore, we have noticed that the overall number of publications and the impact factors are not impressive. If one divides the number of publications by the number of employees, there is, on average, slightly more than 1 publication/ R&D employee from 2007 until now. There are also some publications in international journals of lesser impact and in non-ISI journals which in our opinion are not relevant for achieving international recognition. Although the number of publications and patents is not high enough on average, with respect to the number of R&D staff, there is, however, an increasing trend during the last years.

In the future, the Institute might identify and predominantly support a few selected advanced R&D topics, in which several teams can become international leaders. Also our advice is to focus on quality not on quantity and to avoid publication in journals of low international recognition. Only this will eventually lead to an increase in the international visibility of the Institute.

Individual proposed mark: 3.50

C1.2 Private/international funds

All groups are able to attract private funds and many SMEs were contacted via The Chamber of Commerce, Industry & Agriculture in Timisoara, but unfortunately their co-funding in joint projects remained rather low. An increasing degree of internationalization was noticed and the groups currently participate in two EU projects (FP7) and have multiple bi-lateral and multi-lateral projects and collaborations. As the institute is "practical applications oriented" we do hope that in the future it will be able to attract more funds from the private sector. Also we hope that in the following years the institute will be able to participate in more international collaborations. In connection to the previous point, the higher the international recognition will be (publication in higher impact journals, participation with oral and poster presentations at international conferences) the higher the chances for international collaborations and projects will be.

Individual proposed marks: 4.00

C.1.3 International patents

A few original technologies were developed by the Institute (within the groups of hydrothermal synthesis, non-conventional energies and chemical sensors for biomedicine) which show high potential for industrial applications and for attracting private funds in the future. Until now, there are no assigned or applications for international patents. Although the fees for such patents are very high, this important potential for international patents should be supported and exploited to a higher extent by the Institute in the future. For a few directions, the Institute should be able in the future to recover funds from the exploitation of its intellectual property and original products.

Individual proposed marks: 2.00

C1.4 Start-ups and spin-offs

No start-ups and spin-off companies were founded yet based on original technologies and products developed by the Institute. However, there are three mature technologies in development with a high potential to be applied for starts-ups and spin-offs within the Scientific & Technological Park of Timisoara.

Individual proposed marks: 2.50

C1.5 Sharing and dissemination

The Institute strongly supports the efforts for the scientific dissemination (journal articles, books, and participation in international and national conferences) for increasing the national and international visibility. There are a large number of participations in conferences, inventors' fairs and exhibitions, national and international colloquia. The publication in high impact journals seems to be encouraged as the increasing number of high impact publications in the last couple of years demonstrates, although the scientific performance is still inhomogeneous across the institute. The R&D personnel is encouraged for starting national and international new collaborations in relevant topics. Collaborations with Universities in joint PhD thesis were established, although in a few particular cases the supervising activity from the university coordinator looks slightly formal.

Individual proposed mark: 4.50

Average C1: 3.00

Summary comments:

An increasing number of publications and patent applications are observed, particularly during the last years, in a few research directions. The tendency of publishing in high impact factor journals is noticed. However, there are still a large proportion of publications in low impact journals. From the data provided by the Institute for evaluation, not enough high average number of publications per R&D person was produced. With respect to this, the policy to encourage competitive publication and internationalization will show the fruits in the near future. There are a few groups with impressive

scientific results and with many national patents (assigned and under evaluation). The Institute strongly supports the efforts for dissemination and increasing national and international visibility, as shown by a large number of participation to conferences, inventors' fairs and exhibitions, national and international colloquia. The Institute should focus in the future to identify and support selected topics in the most successful areas.

C2 Human Resource Quality

C 2.1 Performance uniformity

Although the recent scientific performance across the groups looks non-uniform, there are efforts to encourage all scientific teams to follow the model of the successful ones. The solidarity between both the people and the teams is very important in creating a fruitful environment for the R&D activity.

Individual proposed mark: 3.50

C 2.2 Average age and brain gain

The average age of the personnel is excellent (about 37 years old). There is a very good policy to attract highly skilled researchers after their studies abroad (and also foreign PhD students within international projects e.g. Marie Curie) as well as bringing very experienced researchers from abroad back to Romania to start new laboratories and directions. The idea to hire undergraduate students as technicians and then to select the best ones to be enrolled as PhD students and to become researchers is very good. The experience abroad is well evaluated and supported.

Individual proposed mark: 5.00

C 2.3 The ratio of R&D staff/administrative staff

The ratio of R&D staff/administrative staff is about 66/17 which looks reasonable, considering that the Institute has two locations, one in Timisoara and one in Bucharest.

Individual proposed mark: 4.00

Average C2: 4.00

Summary comments:

Although the recent scientific performance across the groups looks quite non-uniform, the evaluation panel was impressed by the efforts of growing and supporting the less productive groups to follow the more successful ones in their scientific efforts. The average age of the personnel is about 37 years and there is a constant effort of knowledge transfer from the experienced PIs towards the young generation. There is also a comprehensive and efficient policy of brain gain, i.e. to attract highly skilled researchers after their studies abroad (including foreign PhD students). Senior researchers from abroad were attracted and supported to start new laboratories and directions within the Institute and encouraged to train young people in their expert research areas. An excellent idea in selecting highly

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skilled personnel consists in hiring undergraduate students first as technicians and then to keep the best of them as PhD students and further full researchers. The ratio of R&D /administrative staffs is about 80%, which looks reasonable considering the fact that Institute has two locations, one in Timisoara and one in Bucharest.

C3 Quality of Infrastructure and Rate of Exploitation

C 3.1 Quality of infrastructures

The Institute presented a very good infrastructure acquired mostly through national projects of various types in recent years. The infrastructure is complementary and shared between different groups; thus, as far as the panel members could notice, there is a coherent policy of sharing the major facilities and of non-overlapping of similar equipments. The very good workshop and technical staff, although very reduced in recent times, is able to produce good quality in-house equipments (e.g. hydrothermal synthesis autoclaves, etc.).

Individual proposed mark: 4.50

C 3.2 Rate of exploitation

The rate of exploitation of the equipment looks efficient, takes place at full capacity and without overlapping of unnecessary expensive equipment in different groups. The equipment is well shared between different research teams in Timisoara. The panel members could not fully appreciate the degree of use for each individual major piece of equipment during the visit, but the group leaders and the scientific committee is fully aware of the research development and the experimental infrastructure necessary for the development of each group.

Individual proposed marks: 4.50

Average C3: 5.00

Summary comments:

There is a constant policy to acquire top level instrumentation at the international level. The equipment meets the international standards in every respect and fits the needs of the scientific groups. The evaluation committee regards the employment and training of technical staff (relatively small number of technicians in permanent positions) as a potential problem for an effective use of the instruments in the future; the continuous training of this staff for the most effective use of the new equipment is strongly encouraged.

C4 Management Efficiency and Quality of Research Environment

C4.1 Staff evaluation and Motivation

The panel members were impressed by the very motivated, active and enthusiastic young and experienced researchers. Among each group member as well as between various groups there is an effective collaboration and transfer of knowledge, without any apparent conflict between generations. In a spontaneous discussion with the PhD students, they declared to be confident in their full career development inside the Institute and on their evaluation and promotions by merit-based transparent criteria. A high degree of satisfaction was addressed towards the management team of the Institute (Manager&colab.) for the pleasant, collaborative scientific and social environment (the Institute leaders had even the initiative to support their accommodation by preparing dormitories inside the Institute).

Individual proposed marks: 4.50

C4.2 Administrative procedures

The questioned individuals among the R&D staff declared to be satisfied by the administrative procedures which look quite effective, particularly taking account for the multiple locations.

Individual proposed marks: 3.50

C4.3 Satisfaction of R&D staff

The researchers are very well trained and they work in a good professional and social research environment. The dedication of the Manager to ensure the best conditions for young researchers is notable, both from the scientific and the environmental and social point of view (including the idea to provide them dormitories inside the Institution!). Throughout the visit, the evaluators found a very high level of overall motivation both at the R&D and administrative level. The young researchers are offered good travel opportunities while the PIs enjoy high academic freedom. We do not have any information regarding the satisfaction related to the overall income of the employees and how fairly this is distributed. For us, from the conversation with PhD students it seemed that in some cases the coordination of PhDs by the university professors is only a formal one. In some situations the PIs charged with their effective coordination in the Institute are not so happy to share the scientific results with the “fictive” supervisors at the university.

Individual proposed mark: 4.00

C4.4 Administrative (operational) efficiency

To measure administrative efficiency is never easy, but the fact that the system runs smoothly suggests that there are no major problems. The location in different places does not seem to create complicated administrative problems. The scientific council meets regularly to discuss the R&D activity and to plan future activities. A long-term planning of scientific activity, equipment purchasing and personnel policy is difficult, given the fluctuations in funding and research support.

Individual proposed mark: 3.50

C 4.5 Transparencies of Decisions

Because of the shortness of the visit the evaluation commission cannot express a fair opinion on this aspect. However, the scientific council meetings are open to the public and the decisions are apparently transparent to the community. The R&D staff is periodically informed about the problems and decisions. The internal evaluations of scientific proposals for new grants or directions is also transparent.

Individual proposed mark: 3.50

4.6 Involving staff in decision making

It was not clear to the evaluation committee to which extent the researchers are involved in the decision making process. However, the scientific council representatives are consulted concerning the project proposals, collaborations as well as other managerial decisions.

Individual proposed mark: 3.50

C4.7 Ethics and good behavior

The questioned researchers appreciated as correct the evaluation of their professional performances; transparent criteria for evaluations and promotions as well as opened doors competitions for new positions and promotions are practiced. No discriminations were reported to the panel members. Correct rules concerning intellectual property and authorship seems to be followed throughout.

Individual proposed mark: 4.00

C4.8 Availability of administrative and auxiliary staff

The questioned members of the R&D staff declared to be satisfied by the performance and availability of administrative and of auxiliary staff. The small technical staff formed by 3 persons was very well acknowledged by all the groups for their ability to build in-house equipment.

Individual proposed marks: 4.50

C4.9 European and International best practices

A few laboratories and procedures were accredited by and in the ISO certification system. "On the spot" interviews suggested that best practices concerning the human resources policy, authorship, gender and discrimination issues are respected. The R&D staff is satisfied by the administrative procedures especially when taking account the multiple institute locations. (two in Timisoara and one in Bucharest)

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Individual proposed mark: 4.50

Average C4: 4.00

Summary comments:

Both R&D and administrative staff appeared motivated, active and enthusiastic. A good collaboration between young and more experienced researchers could be sensed by the evaluating commission. Transparent performance evaluation and merit-based promotion procedures appeared to be commonly used. The researchers are well trained and they work in a professional and sociably satisfactory research environment in which they feel appreciated according to their merits. There is no clear indication about the administrative efficiency, but the fact that the system runs smoothly suggests that there are no major problems. Administrative staff seems to be well organized, available and efficient to fulfill all the R&D needs with fast procedures, particularly considering the multiple locations. The location in different places does not seem to create administrative complications. The technical personnel, although reduced in number, was greatly acknowledged for efficiency and professionalism. A number of laboratories are accredited in the ISO system. The interviews with various employees suggested to us that best practices are used throughout concerning the human resources policy, authorship and gender issues. The groups participate in a large number of national and two European projects, which resulted in a very good infrastructure of the Institute. The management has convincingly assured that the number of novel areas remains limited, such that each of them can reach a critical mass.

C5 Quality and Credibility of the Institutional Development Plan

C 5.1 Development direction

An active and up-to-date development of new ideas on a broad scale into important future areas was clearly noticed. The Institute is modern, well organized with clear and realistic ideas about the future development and a very good and flexible management well adapted to funding fluctuations and to their specific conditions (e.g. 3 locations). The research fields are not imposed by the management; the groups are free to choose their own research directions. As a possible drawback this might result in a lack of focus into major directions.

Individual proposed mark: 4.50

C 5.2 Stimulating new ideas and direction in R&D

Freedom to choose and to develop new research directions is strongly encouraged. New ideas and concepts were developed in sustainable chemistry, environmental protection, photovoltaics, chemical sensors for biomedical applications and electro-organic synthesis. All groups are working in popular and modern areas of research. A degree of dispersion in a broad range of fields is noticed, but this is mainly related to the traditional fields and the situation of the Institute when it was founded. However, the management of the Institute identified some major fields for the future development of the Institute.

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Individual proposed mark: 4.00

C 5.3 Recruitment policy

Discussions revealed an excellent recruitment policy both at the national and the international level (foreign students, returnees to Romania, both young and very experienced scientists). A smart practice is the employment of undergraduate students firstly as technicians, followed by the selection of the best ones as PhD students and further researchers. The qualification and experience abroad is positively appreciated. Transparent evaluation and promotion rules with merit-based criteria are used throughout. The Institute has a constant preoccupation for strengthening weaker groups in order to reach the critical mass for excellence in research.

Individual proposed mark: 5.00

C 5.4 Collaborations and partnerships

All groups have established a wide range of national (mainly) and international collaborations and partnerships, leading to high international visibility at the same time (e.g. Marie Curie project, mobilities, bi-lateral agreements). Partnerships with many universities for joint PhDs are supported.

Individual proposed mark: 5.00

C 5.5 Scientific communication and major projects

Good participation at national and international conferences, exhibitions and inventors fairs leading to a surprisingly high number of distinctions and awards. A few major projects with potentially high impact were identified and will be further supported.

Individual proposed mark: 5.00

C 5.6 Critical mass in key areas

Many areas are well covered by homogeneous and sufficiently numbered teams. However, a critical mass needs still to be reached for some key areas (e.g. organic synthesis, mass spectrometry), to reduce the risk to disappear in case of major personnel fluctuations.

Individual proposed mark: 4.00

Average C5: 5.00

Overall technical considerations, observations, conclusions

The institute has a broad spectrum of research activities in many important areas (e.g. synthesis and analysis, characterization of properties of modern materials and chemical products). The evaluation commission suggests that in the future the focus areas could be narrowed and a groups' reorganization can be established in order to improve the overall scientific performance. The Institute might even consider changing its name to a more appropriate one, according to the new focused directions. Some

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groups are competitive at the international level (e.g. E1, E4, E9) and currently produce high-impact publications.

The overall publication record is good and shows an increasing tendency to higher quality in the last years. However, the scientific production is heterogeneous; in the future the more experienced and productive groups could serve as excellent role models for the less experienced ones. The Institute also exhibits a high level record of implemented national and, to a lesser extent, EU grants, as well as several patents for new technologies. Although efforts were made in this direction by the managers within the Technological Pole and the Chamber of Commerce, Industry & Agriculture in Timisoara, the level of technology transfer is rather low as well as the interest of industrial partners in joint projects. The valorization of the original ideas, technologies and products in a few major areas (e.g. photovoltaics, biosensors, etc.) must be improved in the future.

The Institute is very well managed, with a good and effective leadership, a realistic managerial plan and transparent decisions-taking structure. The panel evaluators had the impression that flexibility is encouraged in choosing the research topics and opening new directions. The policy of employment and promotion is transparent and merit-based. A high level of internationalization is demonstrated by a large number of active international collaborations and various types of projects; foreign students are attracted by the research activity of the Institute.

The evaluation committee was impressed by the high percentage of young researchers (PhD students and post-docs), by their motivation, enthusiasm and their open mindedness. The Institute has a good policy in brain gain, as shown by the large number of people trained abroad and returned to start and fund new laboratories and research directions.

The infrastructure is at a very high level, most of the laboratories being recently equipped with most modern instruments. The infrastructure looks efficiently exploited and efforts to train personnel for their proper use are currently made. In certain laboratories (e.g. synthesis laboratories) the conditions of occupational safety should be improved. We understand. However, that the corresponding measures are being undertaken very soon or are already in progress.

In conclusion our main advice goes in the direction of international recognition through publishing in good/better journals, attracting (more) international funds, getting financial support for international patents as well as organization in Timisoara of some small scientific conferences focused on various research areas of interest and inviting world-wide known experts in the respective fields. Internationally the INCDEMC is just not known well enough.

We can only predict a very bright future for INCDEMC, as the transition period involving the development of a good infrastructure is almost over and now the institute can focus on performance and excellence.

Proposed Certification level: A (4.2)

Team descriptions

E1. Hydrothermal research team

The team E1 is a leading group in Romania in the field of synthesis of crystalline materials by the hydrothermal method. A broad range of materials are produced and investigated by various techniques: single-crystals and powders of piezoelectrics and thermoelectric materials (e.g. Ge-doped

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SiO₂, layered cobalt oxides, chromium oxides, ZnO, phosphates: Al_{1-x}Ga_xPO₄ and Ga_{1-x}Fe_xPO₄). A few recent publications in high-impact journals such as *Chemistry of Materials*, *Journal of Magnetism and Magnetic Materials*, *Crystal Research Technology*, etc. and one national patent were presented.

The group enjoys a high degree of internationalization. The group presented 6 research projects (among them 3 international); one of them (FP7-PEOPLE-2007-1-1-ITN-214040 SOPRANO) is a networking project aimed to train PhD students and young post-docs in the field of spin and orbital physics in transition metal oxides (together with partners from France: Caen (CRISMAT) and Bordeaux (ICMCB), analysis of structural and physical property by high pressure techniques in Liverpool and Madrid, and preparation by hydrothermal synthesis in Timisoara.

One of the main group activities is dedicated to design, manufacturing and testing of various types of autoclaves at high/low temperature and pressure. Possible commercial benefits could be generated in the future by their commercialization, at least at the national level.

The team (including the leader) is young, dynamic, enthusiastic, and the research direction is competitive. It is recommended the concentration of the research topics to a few major types of materials in which the groups might become the leader at an international level.

E2. Multifunctionale Micro- and Nanomaterials

This team is one of the largest in the institute (14 members) and has a long tradition in the synthesis of different materials with interesting electric and magnetic properties. In the last years, based on funds obtained from national agencies, they succeeded to develop synthesis laboratories equipped with modern research equipment. In order to obtain materials with a high crystallinity degree and low dimensional dispersion they realized hydrothermal equipments with immersed sonotrode and simultaneous ultrasound irradiation and microwave heating. Among the nanostructured materials prepared with such techniques we mention:

- titanium dioxide, undoped and doped with metallic and non-metallic ions;
- Bi₂Te₃ doped with Sb, Sn and Ag ions;
- A_xFe_{3-x}O₄ ferrites, with x=0.5; 0.8; 1; 1.2; 1.5 and A= Co, Cu, Ni, Zn;
- AB₂O₄ compounds, A=Zn and B= Ga, Al, undoped and doped with rare earths.

If we consider the structure of the team by the age of its members, we can observe that beside very experienced researchers there are numerous young post-docs and PhD-students involved in the projects that give to the team a very good perspective for enhancement of their performance.

The obtained results have been validated by their publication in scientific journals, mainly international journals, some of them with quite high impact factor for materials science field. The number of scientific papers published in the evaluated period, referenced to the number of team members, is not so high, but one can observe a pronounced tendency of increase in the last two years.

By continuing the collaboration with their valuable international and national partners and by focusing their efforts on fewer topics from the quite large number of the approached ones, we appreciate that the team will become more visible in the international scientific literature and more successful with their projects in national and/or international competitions.

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E3. Materials and structures for solar energy conversion (MASSEC)

The research activities of this group, which started about ten years ago, are focused on materials and devices for solar energy conversion. Main emphasis is placed on various methods of elaboration of micro and nano-structured compounds and their characterization.

The team consists of 6 staff members - 4 full-time equivalent – and 2 PhDs students. If we exclude conference proceedings (6), its scientific/technical output during the last five years is limited to three papers published in international journals and two patents applied for at the local/national level.

Related to the research topics, four projects were funded by Romanian public agencies during the period 2007-2011. Two of them concern materials for solar cell devices, while the two others are relative to hydrogen production.

The team has many collaborations and partnerships, about half on them in Romania, including the Timisoara area, and the others with research groups of neighboring countries (Moldova, Hungary).

Since the research topics are in line with the international trends in this area and the team possesses the adequate expertise and tools, an effort should be made to increase its international visibility. This could be achieved through increased publications in international journals of good standing, inviting world-wide known experts in the field and organizing small-scale scientific events (workshops, seminars, local colloquia). It is believed that this would also contribute to attract international funding.

E4. Biopolymers, proteomics and glycomics

The areas addressed by this research team (inter alia glycoproteomics, glycomics of free oligo- and polysaccharides) are all of very high scientific importance, and there is hence a very stiff international competition in this field. Biological Mass Spectrometry is still a young and hence very quickly developing field, and the chances of making significant contributions here are hence very high. The scientific results will be of very high importance for fundamental research (e.g. screening, sequencing, and structural analysis of various mixtures of glycans), but also from the viewpoint of practical application in fields ranging from natural products chemistry and biochemistry all the way to medicine.

The PI and her research group clearly belong to the leading players in this field. They have reported on their results at national and international conferences as invited speakers, and their scientific publications have appeared in prestigious, high-impact journals. The evaluation committee is convinced that this high visibility can be continued - provided that there is a constant support of the research group by funds for scientific co-workers and equipment.

Presently the laboratory is equipped with the most modern MS and XX-MS-instrumentation, of which a highly effective use is made. Among these state-of-the-art instruments are a Bruker high capacity ion trap mass spectrometer equipped with the most recent software and technology to allow studies in all areas of modern mass spectrometry (hyphenated methods for biopolymer research). Another important instrument allowing high-throughput screening and analysis of the samples is a NanoMate robot system from Advion BioSciences.

The national and international co-operation projects of the team are superb as well, with countless joint projects from very well-known teams from Europe and abroad).

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Because of its scientific excellence the group has attracted substantial funding from national and international agencies.

The participation of the PI and the group members in international conference and symposia is far above average again. This – together with the excellent publication record of the team – has not only lead to a very high international visibility of the group, but also to countless prizes and awards among them the Steinbeis-Lohn Prize of the German Steinbeis Foundation, a prize given in particular for introducing/inventing new methods for *practical* application

Provided that the present support can be maintained the evaluation committee predicts a very bright future for this research team.

E5. The electrochemistry and electrochemical technologies

The general impression of the evaluation committee was that this is one of the weakest groups in INCDEMC. Some more “up to date” research directions are necessary together with the diversification of these research topics. The research group should take this opinion as “constructive criticism”. The fundamental scientific knowledge and all the necessary equipment are already in place. There is the need for a stronger motivation and focus, attracting young researchers into this field and perhaps a stronger collaboration with the more experienced groups. The group does not have sufficient funding and only one collaborative project is mentioned. The publication record for the last 4 years is very poor: there are no papers in an impact factor journal higher than 1.

One research direction of this group relates to fabrication of electrochemical sensors for the detection of dopamine for detecting Parkinson disease. However, this concept has already been published (SENSORS Volume 8, Issue 12, pages 8423-8452) and the only difference in the present case is replacing the conductive carbon substrate with Ni which is not of great novelty and also not really less expensive. Besides, detecting dopamine does not mean that one can detect this disease in the very early stages but that the disease has already been established. There would be more interest if the team would be involved in understanding such a complex disease and finding some electrochemical based treatments to prevent its appearance (e.g. JOURNAL OF CLINICAL INVESTIGATION Volume 113, Issue 2, pages: 274-284).

Another research topic of this group is represented by the synthesis of intermediate products for the pharmaceutical industry involved in the treatment of tuberculosis. However, this is no longer a modern and worrying disease and there are already well established drugs on the market. Pyrazine-2,3-dicarboxylic acid is already produced commercially and it makes little sense to come up with a more complicated but not necessarily cheaper methodology for its production. We do not consider the ongoing research in this direction still necessary.

The group should come up with new ideas and concepts rather than taking well-established processes and changing a few parameters.

The other two research topics of this group are by far more suitable to today's societal needs. Preventing metal corrosion is very important, especially *via* low cost electrochemically deposited organic films. Also the recovery of depleted metal resources from various sources is an important trend in today's society together with waste management. The group should perhaps try to apply for some funding using these novel concepts instead of very old school research concepts.

We not want to encourage the fact that only what is necessarily trendy on the market should be researched. Pharmaceutical industry, electro-organic synthesis and sensing are of course very

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important topics. But the authors should really come up with some more innovative solutions for these fields, publish their results in higher impact factor journals, and give up publishing in national journals. Most western countries already gave up their national journals. Research needs to keep up with modern times otherwise there is no chance for future development. The group should present their results as oral communications at international conferences in the field. Furthermore, there seem to be a lot of similar interests within the E6 research team so maybe these sub-teams should join forces to form a stronger research team.

E6. Applied Chemistry for Environment and Health research team (ACEH)

The research team led by Mariana Nela Stefanut focuses on two main research fields: environment protection and health. Without knowing the previous group activity it seems that research in the field of environment protection is a recent addition. Stefanut's team started thus exploiting the recovery of metals from batteries as well as waste electronics, determination of heavy metals in foods, waters and sludges, PET recycling and concrete carbonization. All these research topics are of extreme importance in today's society. Especially the recycling of PET plastic bottles into useful products should be of high importance, especially in Romania. We believe that such topics are new because the group does not have yet many publications and communications on these particular subjects. We hope that this issue will be improved in the near future. The research topics are respectable but the group needs to build a good reputation nationally as well as internationally.

The research activity dealing with health has also several projects among which the extraction of anthocyanins from red berries and other fruits as well as the synthesis of various biologically active compounds like salicylamides, hydrazides and hydrazones are particularly noteworthy. Here it is worth mentioning that this research group also uses computational chemistry in order to predict the reactivity of various organic and natural substances. The first topic dealing with the extraction of antioxidants as dietary supplements is financed by a collaborative project with the Polytechnical University of Timisoara and with the Clinical Hospital Timisoara. This topic has also the highest number of publications as well as one national patent application and various communications at national and international conferences. The other topics dealing with health are less visible. Especially the topic on the synthesis of new compounds with biological importance seems to be not up to date as such compounds probably already exist on the market and it is very hard to compete with the many pharmaceutical industries working on the discovery of new drugs.

We suggest that the group should focus on the successful projects and also try to further develop the new topics concerning the environment protection and recycling, water treatment etc. Publishing in higher impact factor international journals rather than in national ones is strongly advised. Also the group needs a better publication record and more funding especially by international projects and collaborations in order to become competitive and visible abroad. This can only be achieved by increasing the quality of research potentially by narrowing down the research directions with focus on the important ones. As suggested for E5, as there seem to be many common interests, a re-organization into one stronger group could be beneficial for the institute's future.

E7. Renewable energy

The main field of interest of this team - and its associated partners - concerns materials and technologies for photovoltaic applications. It includes photovoltaic and hybrid small and medium scale

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energy systems. An activity in bio-fuels is also running. Renewable energy is one of the two priority topics in the INCEMC strategy. It appears that the team leads a vigorous federal action to stimulate the scientific community in this field by providing a technology platform accessible to other teams in the country.

The INCEMC part of the team consists now of 12 staff members - 7,2 full-time equivalent – and 3 PhDs students. It is expected that in the next few years this number will be increased by nearly 50% in the frame of an ambitious project on the verge of materialization.

There are a dozen projects running, which are all supported by Romanian public funding. Although, the subjects of these projects encompass a wide variety of subfields, they mainly address photovoltaic conversion, including materials and systems.

At the end of 2013, a new laboratory mainly centered on photovoltaic issues should be operative in a new building which will have an infrastructure adapted to the activities of INCEMC team – with its new composition of 19 members - and by an equivalent number of members from the partner teams.

Note that the team has launched a website accessible to the public to publicize its activities; we recommend similar actions to the other research teams also (if not already available).

E8. Synthesis and Characterisation of Organic Compounds

The work on the analysis and synthesis of fine organic chemicals at the Institute comprises a large area of topics ranging from the isolation, purification, and characterization (structural elucidation) of new natural products, many of them with interesting and important biological properties, to the identification and evaluation of hazardous materials and compounds (e.g. volatile organic compounds, VOCs) and preparation of new nanocomposites for corrosion protection. All of the areas are interesting and should (and must) be pursued. However, the evaluation committee is of the opinion that a certain re-focusing of the topics is desirable, otherwise the group's resources are spread too thinly. For example, the bioethanol production, starting from lignocellulosic waste materials is interesting, but research in this area always has to have the practical angle in view. Whether the new technologies developed here can really compete on the practical level with the already running, large scale production units is an open question. If a re-focus of the research effort is indeed undertaken, it should be open for the inclusion of new synthetic projects. As discussions with various researchers of the group showed the corresponding plans are indeed underway.

The funding situation of the group is adequate, but more efforts should be undertaken to find international/European support. As far as the research topics for such support are concerned, the starting situation appears to be good.

The group has been able to establish numerous collaborative projects, both with Romanian partners as well as those from other European countries. How far these co-operations have developed in the meantime was difficult to judge.

From the instrumental viewpoint the prerequisites for further development and improvement are good. The instrumentation is modern, although not complete. Highly desirable would be an on site NMR spectrometer. Refurbishment and enlargement of various laboratories to allow sophisticated synthetic research are under way or nearly finished, respectively.

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The publication record of the team is too low, and a substantial increase both in the number of articles published as well as the quality of the journal the work is reported in is needed. Communications at national and international conferences should not be counted as scientific publications.

In summary, the committee is of the opinion that the material and scientific prospects of this team are sufficient and more than adequate for the future – but it is only a pathway that has just been started. For a sustainable development it is of utmost importance to create a dependable funding situation coupled with a constant personal and instrumental renewal.

E9. Electrochemistry and PATLAB Bucharest

The E9 lab was “reborn” and modernized by the return of a couple of experienced researchers (Drs. van Staden family from South Africa) to Romania who funded and developed a young group in the field of electrochemistry and chemical sensors for biomedical applications (e.g. for early cancer detection).

This is one of the most active groups in terms of international visibility, by means of many publications in high impact journals (31 ISI papers in the last 5 years) and for their participations to international conferences, with invited, plenary, keynote lectures, oral communications, and posters. Two national patents have been presented to the national authority (OSIM). This group is very active in participating in national and international exhibitions of inventors and their patents were awarded with a large number of medals and awards. The group also enjoys a high visibility for non-specialized audiences, due to a high degree of media popularization.

The laboratory was modernized by using mostly national funds (Capacities, Ideas, Partnership, nucleus), one FP7 project and two bilateral projects and is nowadays equipped at an internationally competitive level with numerous state-of-the-art instruments for research in electrochemistry, sensor development, and process analysis.

The major research directions comprise chemical analysis in the clinic, pharmaceutical and environmental area. The group is multidisciplinary (formed by people in areas of Chemistry, Physics, Computer Science and Medicine) and has collaborations and agreements with universities from Bucharest and Timisoara. They employed a large number of young people (which are also enrolled as master degree or PhD students in university, or young post-docs).

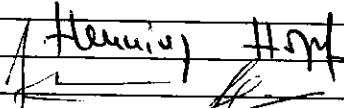
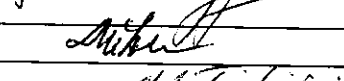
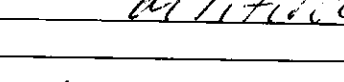
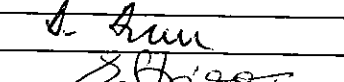
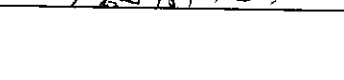



The interdisciplinary co-operations, which are an absolute prerequisite for this type of research, are of very high caliber. This is seen, for example, in the field of sensor development, where the availability of porphyrine substrates is of crucial importance. The research group has access to the leading synthetic organic groups in this field, which guarantees a further successful development in this area.

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Overall technical considerations, observations, conclusions:

The institute has a broad spectrum of research activities in more important areas (e.g. synthesis and analysis, and property characterisation). The commission suggests that in the future the focused areas can be narrowed and a group reorganization can be established in order to improve the overall scientific performance. The Institute might even consider to change its name to a more appropriate one, according to the new focused directions. Some groups are very competitive at international level (E1, E4, E9) and currently produce high-impact publications and patents. The overall publication record is good and shows an increasing tendency in the last years. The scientific production seems slightly heterogeneous; the more experienced groups could be excellent role models for the less experienced ones. The Institute is well managed, with a good leadership, a realistic managerial plan and transparent decision structure. The panel evaluators had the impression that flexibility in choosing the research topics and opening new directions is encouraged. The policy of employment and promotion is transparent and merit-based. A high level of internationalization is demonstrated by a large number of active international collaborations and various types of projects; foreign students are attracted by the research activity of the institute. The evaluation committee was impressed by the high percentage of young researchers (PhD students and post-docs), by their motivation, enthusiasm and their open mindedness. The institute has a good policy in brain gain, as shown by the large number of people trained abroad and returned to fund new laboratories and research directions. Infrastructure is at a very high level, most of the labs being recently equipped with most modern instruments. The infrastructure looks efficiently exploited and efforts to train personnel for their proper use are currently made. In certain laboratories (e.g. synthesis labs.) the conditions of safety should be improved (fume cupboards).

Proposed certification level: A

Nr. crt.	Name, Surname	Signature
Evaluation TEAM		
1	Evaluator 1 - Henning HOPF	
2	Evaluator 2 - Jean-Paul ISSI	
3	Evaluator 3 - Simion ŞIMON	
4	Evaluator 4 - Liliana MITOŞERIU	
5	Evaluator 5 - Maria Magdalena TITIRICI	
Observers		
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2	CCCDI Representative - Dorin DEHELEAN	
3	ANCS Representative - Elena STOICA	

Date: 9/07/2012.

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