INTERNATIONAL CONFERENCE ON HARNESSING THE POTENTIALS OF NEW AND ADVANCED MATERIALS FOR DEVELOPING ECONOMICS

ABUJA, NIGERIA

9-12 AUGUST, 2011

PARTCIPATING COUNTRIES: **16 Developing Countries (Including 15 Member Countries, 1 Non Member Country of the NAM S&T Centre)**

NUMBER OF PARTICIPANTS: **The Workshop was attended by 16 overseas participants including 15 participants from the host country and 28 scientific papers were presented in seven Technical Sessions.**

In recent times, the world of science is fast changing its emphasis to increasingly use the advanced materials and associated technologies for industrial growth by gradually replacing the traditional raw materials as inputs for manufacturing. The advanced materials are technologically developed from conventional materials, but in the process of such development, they acquire specific features with ability to perform the functions which conventional materials cannot. These characteristics include greater strength, higher strength /density ratio, greater hardness, corrosion resistance, fracture toughness, superior thermal, electrical, chemical and optical properties, etc. The novel and advanced materials have proven to have greater economic advantages, especially when these are developed from renewable resources such as natural fibre and plant materials.

The new technology has traversed almost all the sectors of the economy including aerospace, transportation, information technology, environmental protection, medicine and health as well as civil infrastructure. Hence any nation that does not develop its inherent capabilities and potentials in new and advanced materials stands the risk of technological marginalisation. Moreover, the decreasing amount of raw materials needed to manufacture a unit of industrial production globally is leading to a sharp fall in the demand for the conventional raw materials, resulting in a direct negative economic impact on developing exporter nations.

The developing countries need to explore the avenues for adding value to their mineral resources and also join the elite club of nations exploiting advanced materials technology for rapid industrialisation. This therefore has called for a vigorous pursuit of a coordinated programme in the production and utilisation of new and advanced materials and the attendant technological advancements for national development.

In order to deliberate on these issues, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) jointly with the Raw Materials Research and Development Council (RMRDC) of the Federal Ministry of Science & Technology Abuja, Nigeria organised a 4-day International Conference on Harnessing the Potentials of New and Advanced materials for Developing Economies at Abuja, Nigeria during 9^{th}-12^{th} August 2011.

The Inaugural Ceremony commenced with the National Anthem and Opening Prayer. After the welcome address by Engr. Prof. A.P. Onwualu, Director General/CEO, RMRDC, Prof. Arun P. Kulshreshtha, Director, NAM S&T Centre and Chairman of the Inaugural Session gave the introductory address and background of the Conference. This was followed by a Keynote Address on 'Materials Development and Exploitation: The Determining Factor for Technological Advancement' by Engr. Prof. Daniel Oray Nnamdi Obikwelu, Head, Department of Metallurgical & Materials Engineering, University of Nigeria, Nsukka. Prof. Musa Mohammad Sada, Honourable Minister of Mines and Steel Development made a brief address, which was followed by the Inaugural Address by Prof. Ita Okon Bassey Ewa, Honourable Minister of Science and Technology of Nigeria. The Session ended with the Vote of Thanks by Dr. Seb. C. Obasi, Director, Industrial Plants and Equipment Department (IPED), RMRDC, and a group photograph.

16 countries, namely, Egypt, India, Indonesia, Iran, Iraq, Kenya, Malaysia, Myanmar, Pakistan, Sudan, Syria, Tanzania, Togo, Uganda and Zambia, and the host country Nigeria participated in the Conference. The overseas participants were from Egypt [Dr. Mona Hafez Hetta, Head, Pharmacognosy Department, Faculty of Pharmacy, Beni Suef University], India [Dr. G. Padmanabham,

Associate Director, International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad and Dr. U.S. Tandon, Scientist 'G', Council of Scientific and Industrial Research (CSIR), New Delhi], Indonesia [Dr. Kemas Ahmad Zaini Thosin, Researcher, Sciences and Technology Park, PUSPIPTEK, Serpong], Iran [Mr. Hamid Rashidi, Sigma Aerospace Company, Tehran], Iraq [Dr. Sabeeha Abdul Jabbar Beden, Scientific Researcher, Directorate of Materials, Ceramic Centre, Ministry of Science and Technology (MOST), Baghdad], Kenya [Dr. Eric Mwangi, Deputy Director Research, Ministry of Higher Education, Sciences and Technology, Nairobi], Malaysia [Dr. TENG Wan Dung, Principal Researcher, Structural Materials Programme, Advanced Materials Research Centre (AMREC), SIRIM Berhad], Myanmar [Dr. Phyu Phyu Win, Director and Head, Nanotechnology Department and Metallurgical Research & Development Centre, Department of Technical Promotion and Cooperation, Ministry of Science and Technology], Pakistan [Dr. Amir Habib, Assistant Professor, School of Chemical and Materials Engineering (SCME), National University of Sciences and Technology (NUST), Islamabad], Sudan [Mr. Nazar Shawgi A. Ahmed, Director, Materials and Electronics Research Institute, National Centre for Research, Khartoum], Syria [Prof. Khalil AZIMEH, Department of Design and Production Engineering, Faculty of Mechanical and Electrical Engineering, Damascus University], Tanzania [Dr. Leonard Yesaya Mwaikambo, Senior Lecturer, Textile and Materials Science, Department of Mechanical and Industrial Engineering, University of Dar-Es-Salaam], Togo [Dr. Amen Yawo NENONENE, Maître-assistant, Enseignant chercheur, Unité de Recherche sur les Agro ressources et la Santé Environnementale (URASE), Ecole Supérieure d'Agronomie, Lomé University], Uganda [Prof. Barnabas Nawangwe, Principal, College of Engineering, Makerere University, Kampala], and Zambia [Mr. Bruno Mwila, Technical Officer, National Institute for Scientific and Industrial Research, Lusaka]. From the NAM S&T Centre, Prof. Arun P. Kulshreshtha, Director & Executive Head attended the event.

Overall programme of the Conference was conducted at the premises of the RMRDC in seven technical sessions, respectively co-chaired by (1) Engr. Dr. S. O. Momoh, National Agency for Science and Engineering Infrastructure

(NASENI), Abuja, Nigeria and Prof. Barnabas Nawangwe, Uganda; (2) Prof. O.S. Odusanya, Sheda Science and Technology Complex, Abuja, Nigeria and Dr. G. Padmanabham, India; (3) Dr. Babaniyi Babatope, Department of Physics, Obafemi Awolowo University, Ile-Ife, Nigeria and Mr. Nazar Shawgi A. Ahmed, Sudan]; (4) Dr. D. B. Ayo, Research Director, RMRDC, Nigeria and Dr. TENG Wan Dung, Malaysia; (5) Prof. C. O. Nwajagu, Director / Chief Executive, Scientific Equipment Development Institute (SEDI), Enugu, Nigeria and Dr. U.S. Tandon, India; (6) Engr. Dr. J. Ume, Director, Materials and Energy Technology, Projects Development Institute (PRODA), Enugu, Nigeria and Dr. Eric Mwangi, Kenya; and (7) Engr. Prof. A. P. Onwualu, DG/CEO, RMRDC and Prof. Arun P. Kulshreshtha, NAM S&T Centre.

17 scientific papers presented during the Conference by the foreign participants were on 'Biologically Active Waste Product from Natural Source' by Dr. Mona Hafez Hetta of Egypt; 'Smart and Functional Materials and Structures: Design, Developments and Applications' by Dr. U.S. Tandon of India; 'Application of Lasers in Manufacturing' and 'Trends in Advanced Materials Research in India' by Dr. G. Padmanabham of India: 'The Improvement of Commercial Carbon-Steel with Ni-based Alloy Coatings' by Dr. Kemas Ahmad Zaini Thosin of Indonesia; 'Thermal Conductivity Properties of Carbon Nanocone Materials to be used in Re-Entry Vehicle by Using Molecular Dynamics Simulation' by Mr. Hamid Rashidi of Iran; 'Production of Nano Silver Water Suspension using Colloidal Silver Generator' by Dr. Sabeeha Abdul Jabbar Beden of Iraq; 'Policies and Institutional Framework for the Development and Utilisation of Raw Materials (New and Advanced) in Kenya' by Dr. Eric Mwangi of Kenya; 'Ceramic Injection Moulded Mini Crucible' by Dr. TENG Wan Dung of Malaysia]; 'Synthesis of Zinc Oxide Nanoparticles by Precipitation Method and Simple Heating Method' by Dr. Phyu Phyu Win of Myanmar; 'Sol-Gel Synthesis of Nanocrystalline Anatase Titanium Dioxide(TiO_2) at Different pH Values and Temperatures' by Dr. Amir Habib of Pakistan; 'Production and Characterisation of Dry-pressed Porcelain' by Mr. Nazar Shawgi A. Ahmed of Sudan; 'Alloying of Steels with Boron Using Laser Techniques' by Mr. Khalil AZIMEH of Syria; 'Plant Resourced Feedstokes for the Polymers Industry' by Dr. Leonard Yesaya Mwaikambo of Tanzania;

‘Development of Kenaf Particleboards with Binders Based on Aqueous Extracts of Some Tanin Plants of the Flora of Togo’ by Dr. Amen Yawo NENONENE of Togo; ‘An Assessment of the Potential for Traditional and Modern Bamboo Construction Technologies in Uganda’ by Prof. Barnabas Nawangwe of Uganda; and ‘Current Status of Material Research in Zambia’ by Mr. Bruno Mwila of Zambia.

11 Nigerian scientific papers presented during the Conference were on: ‘Green Synthesis of Nanoparticles - Part A: Bacterial Mediated Synthesis of Gold Nanoparticles by Serratia Mercescens, Bacillus Sutilis and B Megaterium’ by Ms. Stella Dozie-Nwachukwu and Prof. O.S. Odusanya of Sheda Science and Technology Complex, Abuja; ‘Green Synthesis of Nanoparticles - Part B: Plant Mediated Synthesis of Gold and Silver Nanoparticles’ by Dr. A.I. Aliyu of Sheda Science and Technology Complex, Abuja; ‘Biosynthesis of Waste-Derived Silver Nano Particles and Their Application to Bioactive Products Development’ by Dr. Jubril O. Akolade of Sheda Science and Technology Complex, Abuja; ‘Challenges and Opportunities of Using Composite Materials in Automobile Industry’ by Prof. S. Bolaji Hassan, Department of Metallurgical and Materials Engineering, Ahmadu Bello University, Samaru, Zaria; ‘Development of Natural Fibre Filled High Temperature Engineering Thermoplastic Composites’ by Prof. Umaru S. Ishiaku, Department of Textile Science & Technology, Ahmadu Bello University, Samaru, Zaria; ‘Investigation of Austenitising Condition on the Tempering Characteristics of Ferritic Ductile Iron’ by Mr. K. A. Bello, Ahmadu Bello University, Samaru, Zaria; ‘Biotechnology for the Development of New and Advanced Materials: The Nigerian Experience’ by Prof. B. O. Solomon, Director General, National Biotechnology Development Agency (NABDA), Abuja; ‘Nanotechnology, Advanced Materials and Manufacturing Status in Nigeria’ by Engr. Dr. S. O. Momoh of NASENI; ‘Development of Polymer Ceramics with Post Consumer Poly Ethylene: Terephythalate Waste Bottles’ by Dr. Olugbade Ebenezer Ajibola of Department of Chemical and Polymer Engineerig, Lagos State University, Epe, Lagos State; ‘Potentials of New and Advanced Materials Development in Nigeria’ by Dr. T.O. Odedele of RMRDC; and ‘Bagasse (Sugarcane Waste): As Low Cost Reinforcement for Advanced Metal Matrix

Composites' by Dr. V. S. Aigbodion, Department of Metallurgical and Materials Engineering, Ahmadu Bello University, Samaru, Zaria.

Before the Closing Session, a special Participants' Interactive Forum, in which the discussion was highly interactive in nature and the participants made specific suggestions and comments, was also organized. This was moderated by Prof. Arun P. Kulshreshtha, who also made a presentation on 'The Role of the NAM S&T Centre for South – South Cooperation in Science & Technology'. Subsequently, there was considerable deliberation and debate on generating a set of recommendations titled 'Abuja Recommendations on Harnessing the Potentials of New and Advanced Materials for Developing Economies'.

The Closing Session was chaired by Dr. (Mrs.) Dere Awosika, Permanent Secretary of the Federal Ministry of Science & Technology of Nigeria, in which the Abuja Recommendations were adopted and the participants were given the Participation Certificates. The outcome of the Conference was summarised with a vote of thanks by Dr. M.L. Buga, Head, Advanced Materials Division of RMRDC.

The participants made brief but highly productive visits to the National Institute for Pharmaceutical Research and Development (NIPRD), IDU and National Agency for Science and Engineering Infrastructure (NASENI), Abuja. Engr. Prof. A.P. Onwualu, DG/CEO RMRDC hosted a banquet dinner with a cultural evening, which was much appreciated by the participants.

The participants thanked the organisers for the successful and fruitful organisation of the Conference and for excellent hospitality and arrangements made for the delegates, and unanimously hoped that more similar events will be held in future with a focus on South-South cooperation.