

Discovery and naming of four new elements in the periodic table

At the 25 July 2016 meeting of the International Union of Pure and Applied Physics (IUPAP) National Committee held in New Delhi, it was reported that the IUPAP has made an important and interesting announcement concerning four new elements in the Periodic Table (at numbers 113, 115, 117 and 118). The experimental discovery of these four new elements was confirmed by a Joint Working Party of IUPAP and IUPAC (International Union of Pure and Applied Chemistry) in January 2016. These new elements have now been named as follows.

Element 113: Nihonium (symbol Nh) was named after 'Nihon', the Japanese name for Japan (the land of the rising Sun). This element was discovered in heavy-ion collision experiments carried out at the RIKEN Nishina Center for Accelerator Science in Japan. The experiment involved bombardment of a bismuth target with a beam of zinc-70 ions from the RIKEN heavy-ion facility and monitoring the lighter products after alpha-decay.

Element 115: Moscovium (symbol Mc) was named after the Moscow region, the location of the Joint Institute for Nuclear

Research (JINR) in Dubna, Russia. The JINR has enjoyed high reputation since its establishment in the Soviet Union. In this particular discovery, the heavy ion accelerator facilities of the Flerov Laboratory, including their gas-filled recoil ion separator, were utilized by JINR scientists in collaboration with researchers from the Lawrence Livermore National Laboratory, Oak Ridge National Laboratory, and Vanderbilt University, USA to carry out experiments in which targets of americium were bombarded by energetic calcium-48 ions.

Element 117: Tennessine (symbol Ts) was named after the US state of Tennessee, in recognition of the long-standing contributions of the Oak Ridge National Laboratory, Vanderbilt University and the University of Tennessee in the production of new elements. Tennessine was produced by bombarding targets of berkelium by calcium-48 ions at the JINR. The rare berkelium target was produced at the high-flux reactor at Oak Ridge National Laboratory.

Element 118: Oganesson (symbol Og) was named after the eminent nuclear physicist, Yuri Oganessian, who has long led the successful Dubna research in the

physics of super heavy nuclei and the search for new elements. The IUPAP/IUPAC Joint Working Party considered it appropriate that Yuri Oganessian be recognized on the occasion of the results obtained in the collaboration between JINR and the Lawrence Livermore National Laboratory which produced oganesson by bombarding a californium target by an energetic calcium-48 beam.

With the confirmed discovery and naming of these new elements, the seventh row of the periodic table has been completed. The question now arises as to whether or not the periodic table has an end.

The chemical and physical properties of these extreme elements and their isotopes remain to be discovered. Laboratories have already embarked on searches for elements, if any, in the eighth row of the periodic table, and work is underway to consolidate the identification of copernicium and heavier elements.

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MEETING REPORT

Sustainable development of the Indian Himalayan Region*

A national consultation meeting on the Indian Himalayan Region (IHR) was held (i) to foster cooperation on sustainable development across the IHR and

*A report on the Multi-stake holders' National Consultation meet organized by G. B. Pant Institute of Himalayan Environment and Development (GBPIHED), as a technical secretariat of the Himalayan Sustainable Development Forum (HSDF), in collaboration with the Department of Science and Technology (DST), Government of India and Indian Himalayas Climate Adaptation Programme (IHCAP) of Swiss Agency for Development and Cooperation (SDC) and held on 29 and 30 December 2015 in Indian Habitat Centre, New Delhi.

promote science-policy-practice connect; (ii) to facilitate dialogue among stakeholders on strategies for climate change adaptation in identified sectors; (iii) to build a vibrant knowledge network to support National and State action plans for climate change, and (iv) to suggest institutional framework for implementation of strategic adaptation plan. The consultation meeting was structured in three technical sessions and each session consisted of keynote address, presentation from participants and a panel discussion. The event was attended by eminent scientists, policy-makers, heads of leading research institutions, NGOs, and consultants from the IHR states:

Himachal Pradesh, Uttarakhand, Manipur, Assam and Meghalaya.

R. M. Pant (National Institute of Rural Development and Panchayati Raj, Guwahati) pointed out that the IHR is a source of immense natural resources that is vulnerable to natural and manmade disasters. Shirish Sinha (SDC, New Delhi) highlighted the key achievements of Indo-Swiss joint research partnership programmes, which includes capacity-building programme on Himalayan glaciology; development of institutional framework for climate change adaptation planning; vulnerability, risk and hazards assessment of biodiversity, etc. P. P. Dhyani (GBPIHED, Almora) briefly