



TAN'99

1st International Conference on the Chemistry and Physics of the Transactinide Elements

The 1st International Conference on the Chemistry and Physics of the Transactinide Elements (TAN'99) was held at the Lufthansa Training Center in Seeheim-Jugenheim (Germany) from September 26 to 30, 1999. Jointly organised by GSI and the Institut für Kernchemie, Johannes Gutenberg-Universität, Mainz, TAN'99 brought together, in an interdisciplinary approach, 120 experts from 17 countries—experimentalists and theoreticians in chemistry and physics—to discuss in a large context scientific aspects of a very special group of chemical elements—the transactinide and superheavy elements.

After a historically oriented opening by G. Herrmann and P. Armbruster, the first day was dedicated to the most recent experiments on the synthesis of the heaviest elements.

S. Hofmann opened the session with a plenary talk emphasising the GSI results. A very lively discussion was triggered by the reports given by A. Yeremin and J. Wild about the significance of the experimental observations from the fusion reactions of ^{48}Ca on ^{242}Pu and ^{244}Pu performed at the FLNR in Dubna. The other exciting news concerned the results from Berkeley. V. Ninov's report on the fusion of ^{86}Kr and ^{208}Pb —so far unconfirmed in SHIP experiments at GSI—also was followed by intense discussions. The audience

left this session with the impression of fascinating and stimulating new results. However, proof of the discovery of elements 114, 116 and 118 will certainly need more and confirming experiments.

Dealing with different aspects of the transactinide elements, a mix of plenary and review contributions was presented during the conference, giving rise to stimulating discussions across the different disciplines:

- atomic and molecular theory demonstrating the influence of increasingly strong relativistic effects (P. Pyykkö, U. Kaldor and V. Pershina),
- theoretical understanding of nuclear reactions (Y. Abe, N.V. Antonenko) and nuclear structure (J.- F. Berger, J. A. Maruhn),
- experimental studies of nuclear reaction mechanisms and new results from nuclear structure experiments (M. Leino)
- chemical separation experiments with single atoms in the aqueous and the gas phase (J.V. Kratz, K.E. Gregorich and A. Türler),
- specific aspects of nuclear fission,
- new technological developments like SHIPTRAP (W. Quint) or planned radioactive ion-beam facilities (A. Mueller).

Examples for further highlights among the topical contributions were

certainly the reports about the first chemistry performed on element 107 (R. Eichler), the observation of the ground-state rotational band of nobelium-254 up to angular momenta 16^+ (P. Reiter), and the recent approaches to introduce new techniques like laser spectroscopy or ion traps for experiments with transactinide elements.

The large number of contributions dealing with theoretical approaches to describe and understand nuclear reactions leading to the heaviest elements was very much welcomed. The poster sessions held on two evenings provided the possibility to present and discuss all aspects of superheavy element research. These discussions were casually continued in small groups at the bar until late at night.

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The nuclear chemistry group at the Lawrence Berkeley National Laboratory, under the chair of D.C. Hoffman, H. Nitsche and K.E. Gregorich, has volunteered to organise the next TAN to be held in California in 2003. The series of workshops on transactinide elements, from which TAN'99 arose, will be continued in 2001. ■