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CONFERENCE REPORT

THIRD INDIAN NATIONAL SEMINAR-CUM-WORKSHOP ON SSNTD AMRITSAR, INDIA, 7 – 9 MARCH 1983

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THE THIRD national seminar-cum-workshop on solid state nuclear track detectors (SSNTD) in India was held at the Guru Nanak Dev (GND) University, Amritsar, during 7 – 9 March, 1983. [The reports on the first two seminar-cum-workshops appeared in *Nuclear Tracks* **3**, 145 – 146 (1979) and **5**, 331 – 332 (1981)]. About fifty delegates from different research institutions and universities in India attended the seminar. Financial support from several national agencies such as University Grants Commission (UGC), Department of Science and Technology (DST) and Indian National Science Academy (INSA), New Delhi, was received for organizing the seminar.

The three-day seminar was inaugurated by Professor J. S. Grewal, the Vice-Chancellor of GND University. The keynote address, presented by J. N. Goswami [Physical Research Laboratory (PRL), Ahmedabad] dealt with some of the recent work in this field, both at national and at international level, and emphasized the possibility of carrying out significant experiments using the simple SSNTD technique. He cited the recent attempt by the Berkeley group to characterize the nature of the anamolons and the Indian cosmic-ray experiment to be flown in Spacelab-III as examples in this context.

The seminar proper started with the presentation of two review talks delivered by R. H. Iyer [Bhabha Atomic Research Centre (BARC), Trombay] and J. S. Yadav [Tata Institute of Fundamental Research (TIFR), Bombay]. Iyer outlined the potential use of SSNTD in every stage of the nuclear fuel cycle, starting with ore prospecting and including other areas like material characterization, reactor operation parameters, and stringent safety requirement, etc. Yadav gave an overview of SSNTD studies carried out in Russia, and specifically at the Joint Institute of Nuclear Research (JINR), Dubna. He particularly noted their effort to use SSNTD in studying heavy-ion reactions and in the search for superheavy nuclei in extraterrestrial materials.

Out of about forty-five contributed papers, thirty were presented in five separate sessions during the seminar. The contributed papers dealt with topics in the fields of fission-track dating, characteristics and use of track-recording polymers and glasses, measurement of trace-element concentrations in various substances, cosmic-rays and extraterrestrial objects, and SSNTD techniques. In the session of fission-track dating, a group from the Birbal Sahni Institute of Palaeobotany (G. Rajagopalan, A. P. Srivastava and H. S. Saini) presented experimental results suggesting the suitability of the mineral glauconite for fission-track dating. Being an authigenic mineral found in sedimentary deposits, this mineral may prove to be extremely useful in dating sedimentary rocks. In the same session H. S. Virk (GND University) presented evidence for a secondary impact in the Australasian tektite field at 0.32 Myr. before present.

Several papers were presented in the session on track-recording polymers that dealt with the track-recording characteristics of different types of CR-39 and of cellulose acetate butyrate (CAB). The use of research-grade plastics for high resolution studies was considered to be essential to avoid variations in response characteristics of commercially available CR-39 and CAB detectors. Detailed studies of scattering of energetic (28 MeV) alpha particles from gold and carbon targets carried out by the group from the Saha Institute of Nuclear Physics, Calcutta (B. Choudhury and A. K. Ganguly) using CR-39 (Pershore) detectors indicate the possibility of using this detector for accurate alpha spectrometry. Collaborative studies carried out by the Kurukshetra and Birmingham Universities (S. M. Farid, A. P. Sharma and S. A. Durrani) on the response of various plastic detectors as thermal-neutron

dosimeter show that the fluence and dose sensitivity are higher for CR-39 compared to those for CR 80-15 and LR 115 plastic detectors.

Five papers dealing with track-recording properties of glasses and minerals were presented during the seminar. The GND University group reported the suitability of an alkali etchant (65% NAOH) for quartz. The possibility of using a locally available microslide (uranium concentration = 0.77 ± 0.006 ppm) as neutron dosimeter during reactor irradiation was put forward by the Aligarh University group (D. S. Srivastava, S. Kumar and L. Chand). Representation of bulk- as well as track-etch rate in terms of activation energy and Arrhenius type of expression that includes the etchant concentration, etching time and temperature was also proposed by GND University group (H. S. Virk and S. K. Modgil).

The papers in the session on trace-element studies using SSNTD mainly dealt with the measurements of uranium, radon and thoron concentrations in various substances such as soil, water and plants, etc. P. C. Ghosh and B. Venkataraman (Atomic Minerals Division, Hyderabad) described the technique developed by them for radon/thoron discrimination and presented a case-study to illustrate the potential use of the technique in uranium prospecting. Several papers of diverse nature were presented in a session entitled diverse applications. The groups from Kurukshetra University (K. K. Chakravarty, K. L. Bhatia, S. K. Mahna and K. K. Nagpaul) described the results of trace-element studies in structurally different semiconductors, R.F. sputtered thin films and crystalline KCl, and the dependence of the doped trace-element concentration on growth conditions and other related parameters.

A systematic study of the rôle of polarization and polymer type in the process of electrochemical etching (ECE) led the BARC group (A. M. Bhagwat, C. M. Sunta and S. D. Soman) to conclude that polar nature and low values of dissipation factor or dialectric loss factor are the important parameters governing ECE track-recording properties of polymers. Description of a simple device for track-annealing studies that can be used for simultaneous annealing of grains under different time-temperature combinations was presented by R. Jha and D. Lal (PRL, Ahmedabad). Instrumentation for cutting plastics, specifically CR-39, into various forms using a laser beam was described by the BARC group (L. M. Kukreja, D. D. Bhawalkar, W. K. Chatterjee and B. I. Gupta).

In a paper presented in the session on studies of extraterrestrial material, C. Basu and J. N. Goswami (PRL) reported observations of ^{244}Pu fission tracks in refractory oxide and silicate phases isolated from several carbonaceous chondrites. In another presentation in this session J. S. Yadav reported observation of three very long tracks in olivine grains from pallasites, in work carried out in collaboration with investigators from JINR, that may be attributed to transuranic nuclei and perhaps to superheavy nuclei.

Overall, the deliberations in the seminar represented a steady progress in India in the field of application of SSNTD in various research areas over the past couple of years. The lack of effort on utilization of SSNTD techniques in technological areas was, however, felt during the seminar. It is planned to bring out a proceedings volume of the seminar, containing expanded versions of selected abstracts presented during the seminar. This volume will be ready for distribution by the middle of 1983. The Kurukshetra University, Kurukshetra, has agreed to host the fourth national seminar on SSNTD to be held in early 1985.