some newer Award needs to be formulated.

5. The proceedings in the form of full papers (after peer review) should be published before the start of the next ISC. This would definitely boost the morale of the authors, especially of the youngsters.
6. In the case of ESS, a vast field is covered, encompassing both land geology and oceanography. It would probably be good to divide the ESS into two to cover the fields individually. Presently, most oceanographers skip the ESS since talks on land geology and techniques, are 'heavy' and non-connected to their research work.
7. Many a time the presentations leave much to be desired. For instance, the presenters put up slides and over head transparencies that are of very poor quality. Further, even some of the veterans in the field read out from the slides and OHP, instead of being little more extempore!
8. The ISC should be held once in two years. This could give time for the participants to better prepare and also help conserve national resources.

In the final analysis, it is seen that there is scope for changes at all levels. This is pertinent since preparations may have been initiated for the 2001 ISC show. Hence, this would be the right time to make amendments to improve the quality of the presentations and help attract more talents.

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NEWS

Another Indian optical observation of a gamma-ray burst afterglow from UPSO, Nainital

Gamma-ray bursts (GRBs), short and intense flashes of cosmic high energy (~ 100 keV – 1 MeV) photons, are unique phenomena. Their observed intense emission which often dominates the high-energy sky during their brief appearance has no parallel in all of astronomy. They are electromagnetically the most luminous events in the Universe as they release ~ 10^{51} – 10^{54} ergs or more of energy in a few seconds. The afterglow emission is similar in nature to the emission from supernova, but is more energetic by a few orders of magnitude. Following the naming sequence, nova and supernova, it is therefore appropriate to refer to the optical transient associated with GRBs as hypernova. GRBs have therefore become the crossroad of a network of knowledge, e.g. study of parent objects and probe of ancient Universe at a scale of distance deeper than that of supernovae. The origin of GRBs is still a mystery, though the phenomena were discovered in the late sixties. Multi-wavelength follow-up observations of the GRB afterglows at X-ray, optical and radio wavelengths have contributed significantly to our understanding of GRBs. They indicate that most likely all GRBs occur at cosmological distances.

For the first time in India successful observations of the optical transient of a GRB were carried out at the Uttar Pradesh State Observatory (UPSO), Manora Peak, Nainital on 23 January 1999 (Ram Sagar, *Curr. Sci.*, 1999, **76**, 865). After about 11 months, successful Indian optical observations of another GRB afterglow have again been carried out from UPSO.

An extremely intense 60-s long GRB was observed on 8 December 1999 at 04 : 36 : 52 UT (GCN 450). Its afterglow emission has been observed at several wavelengths located in radio, millimeter and optical regions at $\alpha_{2000} = 16^h\ 33^m\ 53.5^s$; $\delta_{2000} = +46°27'21''$. The optical observations of the GRB 991208 afterglow were made on December 1999 12.0, 13.0 and 14.0 UT in Cousins *I* passband using a 2048 × 2048 size CCD chip mounted at the f/13 Cassegrain focus of the 104 cm Sampurnanand telescope of UPSO, Nainital. As this GRB is located mostly in the daytime sky, making optical observations was a very difficult task. On all three nights, observations could be made just before the morning twilight at high air-mass (> 2) but in good photometric sky conditions. Long durations of nights at Nainital in December helped in carrying out observations at least for an hour or so. The results of UPSO observations are given in Table 1. On December 1999 14.0 UT, the object was very faint and was barely visible on the image for one hour exposure. We have therefore been unable to measure the magnitude from that image. The present observations in combination with the published ones have been used to derive decay of the optical transient of GRB 991208 in *R* and *I* passbands. The object is fading very fast and follows the following linear relations:

$$R(t) = 16.95(\pm 0.06) + 5.5(\pm 0.1)\log(t),$$

$$I(t) = 16.52(\pm 0.01) + 5.0(\pm 0.01)\log(t),$$

where t is the time in units of days after the trigger of the γ-ray event on December 1999 8.19 UT. The coefficients and their errors are obtained by fitting least square linear regressions to the observed magnitudes as a function of time. The flux decay of the optical transient is well characterized by a power law, $F(t) \propto t^{-\alpha}$, where $F(t)$ is the flux at time t and α is

Table 1. Results of UPSO observations of the GRB 991208 afterglow in *I* photometric passband

Time in UT	Magnitude
December 1999	
12.02	19.4 ± 0.18
13.00	19.9 ± 0.14
14.00	> 20

the decay constant. Allowing for factor ~ 2.5 involved in converting the flux to magnitude scale, the values of α are 2.2 ± 0.1 in R and ~ 2 in I passbands. This indicates that flux decays in R and I photometric passbands are almost similar. These decay constants indicate that at optical wavelengths afterglow emission from GRB 991208 is decaying much faster in comparison to that from other GRBs observed so far except GRB 990510 where at times later than 1.57 ± 0.03 day after trigger of the burst the value of the decay constant is 2.4 ± 0.02 (Stanek *et al.*, *Astrophys. J.*, 1999, **522**, L39). This is also the brightest afterglow detected at millimeter wavelengths to date. Thus the emission from GRB 991208 afterglow presents an interesting case for understanding the origin of radiation from a γ-ray burst across the entire electromagnetic band.

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Molecular materials are the future*

A winter school in Solid State and Materials Chemistry was organized by the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) to commemorate its eventful existence for ten years.

Materials chemistry encompasses solid state chemistry, carbon science, ceramics, composites and even polymer science in its definition. As the field has evolved, the emphasis has shifted from basic theoretical work to technological applications. With the emergence of new R&D directions, this winter school was intended to acquaint the participants with the latest developments in the area of chemistry and physics of materials. More than 50 delegates from around the country attended the school. There were two participants from abroad, one each from USA and UK. The experts were drawn mostly from the host institute and Indian Institute of Science (IISc), Bangalore. Six outstanding scientists from abroad spoke on the future of their chosen field of study.

Inaugurating the course, C. N. R. Rao (President, JNCASR) said that the school was designed to provide budding researchers an overview of most of the new developments in the area of solid state and materials chemistry and help formulate new directions for research. In his opinion, megastable (molecular) materials will rule the next century because of the increasing demand for their potential applications as advanced performance materials to be used in information processing, communication, armament and transportation. He exhorted the participants to develop new methods for synthesizing and characterizing materials and discover new strategies of tailor-made materials with desired and controllable properties.

The course content of the school consisted of 37 lectures and the session started with a talk by C. N. R. Rao who introduced the subject of materials chemistry and compared it with solid state chemistry. According to him, the most important discoveries in solid state and materials science in the last decade include high temperature cuprate superconductors (1986), supramolecular chemistry (1987), fullerenes and nanotubes (1990), mesoporous solids (1992) and colossal magnetoresistance in manganates (1993). He gave an overview of the recent advancements in the synthetic strategies for developing inorganic materials using transition metal oxides and perovskites. In another lecture he discussed various methods of synthesis and structural elucidation of nanotubes which are long, cylindrical molecules consisting of a circular array of sp^2 hybridized carbon atoms. They are capped at both the ends and can be thought of as elongated fullerenes. Their potential use lies in them being useable as quantum wires in nanoscale electronic devices and catalysis. His third lecture dealt with the charge ordering in rare earth manganates. $Ln_{1-x}A_xMnO_3$ (Ln, rare earth; A, alkaline earth) have created wide interest because they exhibit colossal magnetoresistance (CMR).

C. R. A. Catlow (Royal Institution of Great Britain, London) spoke on atomistic computational and modelling techniques in materials science. In his second lecture, Catlow discussed the molecular diffusion processes in crystalline mesoporous materials using molecular dynamics and flexible framework technique.

That nickel sulphide selenide ($NiS_{2-x}Se_x$) which exhibits electron correlation effects can be used as a paradigm for manipulating electron interactions in solids was demonstrated by the presentation of J. M. Honig (Purdue University, USA). Delivering a separate lecture he reviewed the recent trends in the physics and chemistry of V_2O_3 systems and presented the results of electron correlation effects.

G. Ferey (University of Versailles, France) presented an account of how one could use microporous solids in gas separation, shape selective catalysis, elimination of NO_x and in fundamental research for making the earth more and more green, producing pure water and air. He explained the formation of $M_2(PO_4)_3F_2$ (M, Al, Ga) based on the hexameric unit of oxyfluorinated phosphates. The field of three-dimensional hybrid open-framework inorganic materials has received considerable attention and in his second talk, Ferey gave an overview of the methods employed in their synthesis, structural variations, properties as well as applications of this growing class of materials.

Application of high resolution X-ray diffraction technique in predicting the position of atoms in molecules and molecules in crystals was the subject of a talk by G. U. Kulkarni (JNCASR). In a second talk he described some of the anomalous electronic properties of metal nanocrystals.

*A report on the winter school in Solid State and Materials Chemistry, organized and hosted by the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, during 29 November–4 December 1999.