CORRESPONDENCE

linked and the major universities and
HIs are connected through various net-
working projects such as educational
and research network (ernet), etc. How-
ever, the availability of limited re-
sources and infrastructure in most parts
of the research institutions and institu-
tions of learning have posed severe
constraints on accessibility of these
information highways to the geosci-
entific workers of India.

The WEB is a monster from where we
could collect any information. There are
many search engines and metasearch
engines that could bring links to sites
that contain information pertaining to
the phrases of search strings. However,
given cognizance to the enormity of the
WEB, often those who search required
information end up with unwanted or
not related links among the really re-
lated links. Our experience shows that
there is a lot of stuff on the WEB re-
lated to geosciences, but getting the
exact information is often found to be a
tough task. For example, when Yahoo (a
famous search engine) was employed for
searching geological societies, it has
given 1389 links in which only 7 are
hypertext links to 'geological societies!',
which in turn is learnt after browsing as
many possible links as browsing all these
links would be unimaginable.

Given cognizance to all these, a site
called Global Geological Resource Lo-
cator (GGRL) has been created sourcing
links of geological sites the world over.
This site is targeted primarily to the
Indian geological community to serve
them the required information at a sin-
gle location. The GGRL is a web page
that contains catalogues of different
categories of web sites. The user has to
click the related category which will
lead to a list of hypertext links from
where, the required site could be se-
lected and browsed.

Presently 37 categories (for example,
academic societies, remote sensing,
mineralogy, geological survey organi-
zations, etc.) are available in the site.
Constant upgradation is also being
made. The site could be accessed at
html.

Another category to this site is under
construction that specifically concen-
trates on providing information regard-
ing Indian geological and related
professional societies, Indian universi-
ties and research labs engaged in geo-
logical and related fields. The readers
are requested to send information on the
same, so that they could be included,
and benefit the geological community as
well as the prospective students who
intend pursuing their studies in Indian
universities and institutions of research.

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NEWS

A novel method of growing bulk single crystals

Organic single crystals of substituted
benzene derivatives with high optical
non-linearities and low melting tempera-
tures are very promising materials for
future optoelectronic and nonlinear op-
tical applications. However, it is diffi-
cult to grow large size organic
single crystals. Recently, Sankaranaray-
anan of Alagappa University, Karaikudi
and Ramasamy of Anna University,
Chennai, have successfully grown a
large size single crystal of benzil
having hexagonal facets (Figure 1) by a
novel seeding method using a microtube
and based on Czochralski pulling tech-
nique. The conventional Czochralski
technique involves three steps, viz.
melting the source material, seeding the
melt and pulling the crystal. In this re-
cent study, an attempt is made to seed
the melt with a stainless steel microtube
of 6 μ ID. Due to capillary rise, a fine
column of melt is crystallized inside the
microtube which is used as a primary
seed. In their experimental set-up
(Figure 2), the material is melted in a
static glass crucible, which is kept in-
side an independently controlled two-
zone Kankanthal wire-wound furnace and
the microtube is dipped in the melt. The

Figure 1. Benzil single crystal 'C' with the microtube as a seed. Reprinted from Journal of Crystal Growth, vol. 193, K. Sankaranarayanan and P. Ramasamy, 'Microtube-Czochralski technique (μT-Cz): a novel way of seeding the melt to grow bulk single crystal', pp. 252-256, © 1998, with permission from Elsevier Science.
nucleation inside the tube is controlled by the following experimental parameters: radius and rotation rate of the microtube, melt temperature at which the microtube seeding is made \(I_{\text{ms}}\), pulling rate, axial temperature gradient and the length of the microtube underneath the melt surface \(l_{\text{ms}}\). The authors have reported three growth runs corresponding to \(l_{\text{ms}} = 0.5, 1\) and 1.5 mm. Once the growth run is completed, the system temperature has to be reduced at the rate of \(1^\circ\text{C/h}\). Any rapid cooling results in a crack in the crystal grown. For \(l_{\text{ms}} = 1.5\) mm and with modified axial gradient a benzil single crystal with high quality transparency, having near planar crystal-melt interface is obtained. The crystal pulling rate is maintained at 1.2 mm/h at \(l_{\text{ms}} = 90^\circ\text{C}\). The crystal rotation rate is 6 rpm. There also exists a critical rotation rate relative to the radius of the microtube. Only below this rate, the change in crystal rotation is influential in deciding the morphology of the resultant crystal. They have also analysed the effect of \(l_{\text{ms}}\) on the nucleation. If the melt level and the crystal orientation inside the tube along two sides are the same then the value of \(l_{\text{ms}}\) is not vital. If the crystal orientation along two sides of the tube are different then the value of \(l_{\text{ms}}\) plays a crucial role. The value of \(l_{\text{ms}}\) should be sufficient enough to allow any one of the orientations at the end of the microtube as the deciding crystal orientation. This technique is viable to grow a bulk single crystal from the melt without a pre-grown seed and the reproducibility for getting single crystals is about 80%.


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**Nuclear structure and dynamics**

A national workshop was organized to take stock of the present research accomplishments in nuclear structure physics and to set the agenda for the coming decade.

B. K. Jain (BARC, Mumbai) in his inaugural address, pointed out several examples like studies on long-lived isomers which have the capability to spring new technological applications. Ranjan Bhowmik (NSC, Delhi) presented a special talk on ‘Nuclear Structure at the Nuclear Science Centre – Present and future’, and emphasized the role of NSC in providing a world class experimental facility to universities. He also presented an overview of the future experimental facilities like the upgradeation of the existing pelletron accelerator by adding superconducting linac modules and also the proposed setting up of a national gamma detector array. Addition of a gas-filled recoil separator will make this facility one of the few in the world. H. C. Jain (TIFR, Mumbai) presented a similar talk on the existing facilities at TIFR, Mumbai and unveiled the future expansion plans of the TIFR pelletron.

One of the focal points of research in nuclear physics nowadays is the synthesis of new elements both heavier than those found in nature and also away from the line of stability. Theories have long ago predicted the existence of an island of stability beyond the atomic number \(Z = 114\). It has, however, not been able to reach this island so far. The elements \(Z = 110-112\) were discovered at GSI, Germany a couple of years ago. A few months ago, labs in USA and Russia have made a breakthrough in synthesizing the element with \(Z = 118\). This represents a major leap forward and has already initiated a race to build new elements. It is important that India has the capability to make these new