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First Indian Honorary Fellow of the Institute of Information Scientists

Subbiah Arunachalam of the M. S. Swaminathan Research Foundation has been elected an Honorary Fellow of the Institute of Information Scientists, UK, the highest in the three categories of membership that this apex professional body of information scientists has. The only other Asian who is currently an Honorary Fellow is Liu Zhaodong, President of the Chinese Society of Scientific and Technical Information, Beijing.

Stockholm Challenge Award for M. S. Swaminathan Research Foundation

The Information Village Project of the M. S. Swaminathan Research Foundation, has won this year's Stockholm Challenge Award in the Global Village category. The citation reads as follows:

'The Information Village Research Project is an outstanding embodiment of the spirit of the Stockholm Challenge to promote inclusion through the use of information and communication technologies. Today, thanks to the Information Village Project, ten villages near

Pondicherry, India, are linked with computers, providing information on such aspects as health, crops, weather, and fishing conditions. These new technology tools are bridging the economic and social divide between the haves and have nots. They are empowering everyone with knowledge and opportunity by an inclusive use of local languages and a multimedia format that allows all to participate. Because of this project, some traditional barriers have fallen. For example, a temple that formerly excluded low-caste people now opens its doors to everyone, so they may use computers. This project is a wonderful example of the benefits of IT, and of the power of information and opportunity'.

Prof Y. T. Thathachari Research Award for science – 2001: A report

The Bhramara Trust of Y. T. and Madhuri Thathachari, Mysore, set up in the year 1994, is dedicated to promote education, provide relief to the poor, medical aid to the sick, encourage research in science, Sanskrit studies and innovation in fine arts and in creative writing. In January 2001, the Board of Trustees decided to encourage pioneering research in science by instituting a national award in memory of Y. T. Thathachari. Thathachari worked at MIT, Stanford University and the University of California Medical Centre, San Francisco, USA. He was a visiting professor at the Indian Institute of Science (IISc), Bangalore, and the Indian

Institute of Technology (IIT), Chennai. His research field was wide and varied, encompassing crystallography, X-ray diffraction, electron microscopy, XAFS studies, Kirlian photography, new imaging techniques, medical information science and studies on language and information. This brilliant scientist, who was diagnosed for cancer in 1963, conquered it and lived for thirty years. He passed away in November 1993 at the age of sixty-three.

Y. T. Thathachari Research Award for Science is a biennial award. It is given to researchers from physical/chemical/mathematical science and life/agricultural science alternately. The

award carries a cash prize of rupees one lakh and a citation. The award money is given to the host institution to be used by the awardee for his/her research work. The award aims to encourage high quality research in the country by insisting that a major portion of the work should have been carried out in India.

The winners of the award for 2001 are S. V. Bhat from the Department of Physics, IISc, Bangalore, and R. S. Sirohi, IIT, Delhi.

S. V. Bhat is an experimental physicist making significant contributions in the field of nuclear magnetic resonance (NMR) and electron spin resonance. His

research work spanning nearly three decades, is in the application of NMR technique for the study of phase transition in solids, fast ionic conductors and high temperature superconductors. R. S. Sirohi has distinguished himself in the field of applied optics. He has used modern optical techniques to make precision mechanical measurements.

Interferometry, speckle phenomena, holography and ellipsometry have been effectively used coupled with electronic instrumentation, computing techniques and metrological principles.

The awards were presented on 6 September 2001, by V. S. Rama Devi, Governor of Karnataka, who presided over the function. R. Chidambaram, Homi

Bhabha Professor, BARC, and former Chairman of the Atomic Energy Commission was the chief guest. He gave away the scrolls and cheque to the awardees.

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RESEARCH NEWS

A revised look at π -electron delocalization in benzene

G. Narahari Sastry

Aromaticity occupies a central place in chemical thought. Aromaticity as such, is not an experimental quantity and no generally acceptable definition has been established to quantify this property¹⁻³. Conventionally, it is associated with conjugated π -systems with very high stability, planarity, delocalization with small bond length alternation, preference for substitution reactions over the addition reactions, and exalted diamagnetic susceptibilities. Aromaticity is associated with cyclic arrays of mobile electrons with favourable symmetries, leading to fully delocalized structures with equal bond lengths. Benzene is a seminal example of aromaticity⁴. Antiaromatic systems are characterized by localized rather than delocalized electronic and geometric structures. π -bonding and σ - π separation in the planar conjugated systems are an integral part of contemporary chemical thinking⁵. The σ - π separation was the basis for the famous Huckel rules which account for the special stability for closed shell $4n + 2$ π -electron systems and instability for $4n\pi$ -electron systems. The stability of cyclopropenyl cation and the apparent instability of cyclobutadiene laid strong foundations to the $4n + 2$ rule for aromaticity, and the $4n$ rule for antiaromaticity. These Huckel rules have become among the most powerful paradigms of chemistry, in general and organic chemistry, in particular. Consequently, aromatic species

are associated with highly delocalized π -electronic component, with equal bond lengths, and special stability relative to an open-chain reference. In contrast, antiaromatic systems exhibit bond localizations and their geometries are non-uniform, exhibiting alternating C-C bond lengths. π -delocalization and geometry have thus found a strong link in the aromatic and antiaromatic organic compounds. This led to a 'popular belief' that symmetric geometries, with equal C-C bond lengths, in species such as benzene or allyl are due to the inherent tendency of π -electrons for strong delocalization in the aromatic species. Apparently, these ideas have become so popular and powerful and also an integral part of our thinking in structural organic chemistry, without any concrete proof.

Early recognition of π -distortivity paradox

While the π -delocalization in benzene became standard textbook material, some theoretical and spectroscopic studies led to a contrary viewpoint, namely these results pointed out that π electrons in benzene are distortive in nature. Longuet-Higgins and Salem recognized as early as in 1959, that distortivity of π -electrons exists already in benzene, using the Huckel theory with a variable, β (ref. 2). A similar

argument was used to account for the low experimental frequency of the b_{2u} vibrational mode in benzene, by postulating that the bond alternation caused by the distortion lowers the π -electron energy⁶. Shaik and Bar⁷ also came to the same conclusion based on qualitative VB ideas, that the π -component in benzene is distortive. The valence-bond treatments by Mazumdar and Dixit⁸ as well as Soos and Ramasesha⁹, of Hubbard and extended Hubbard rings, essentially predict the distortion. However, these views which were familiar to the spectroscopic community have not gained much ground in organic chemistry, which accumulated tremendous support for the special stability of benzene and association of this stability with the 'aromatic behaviour of π -electrons' in the light of Huckel rules.

Thus, although the recognition of π -distortive tendency is quite old, significant effort was not taken to probe this problem and convince the traditional organic chemistry community about this seemingly unbelievable hypothesis that π -electrons have inherent distortive propensity in benzene.

Shaik-Hiberty approach

However, in early the 1980s, Sason Shaik examined the process of interconversion between the two Kekule structures as a reaction, using his, then