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Mostafa A. El-Sayed

This issue is dedicated to Mostafa El-Sayed from his scientific family and friends.

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Scientific Co-workers

Postdoctoral Fellows. Dr. T. Pavlopoulos (1962−1964); Dr. J. Roy (1963−1965); Dr. K. Eisenthal (1964−1965); Dr. N. Chaudhuri (1964−1967); Dr. W. Moomaw (1965−1966); Dr. M. Bhaumik (1966); Dr. D. Tinti (1967−1970); Dr. E. Migirdicyan (1968−1969); Dr. O. Kalman (1969−1970); Dr. T. Kuan (1969−1971); Dr. A. Shain (1970−1971); Dr. P. Esherick (1973−1975); Dr. P. Zinsli (1973−1975); Dr. S. Sheng (1974−1976); Dr. P. Avouris (1975−1977); Dr. J. Berg (1976−1978); Dr. R. Moncorges (1977); Dr. A. Burns (1978−1980); Dr. J.-H. Lee (1980−1982); Dr. J. Simon (1983−1984); Dr. P. Dupuis (1983−1985); Dr. P. Evesque (1984−1985); Dr. K. Ismail (1985−1986); Dr. E. Chronister (1985−1987); Dr. A. Eychmuller (1987−1988); Dr. D.-J. Jang (1987−1989); Dr. R. van den Berg (1988−1990); Dr. K.-J. Hsu (1989); Dr. L. Song (1992−1994); Dr. S. Logunov (1993−); Dr. S. Yoo (1993−); Dr. V. Kamalov (1995−).

Visiting Professors and Scholars. Professor J. Olmsted, American University of Beirut (1970−1971); Professor W. Moomaw, Williams College (1971−1972); Professor P. Wagner, Michigan State (1971−1972); Professor W. Ware, University of Western Ontario (1974−1975); Dr. A. Merle, University of Bordeaux (1977−1978); Professor J. Prochorow, Polish Academy of Sciences (September to April 1979); Dr. B. Karvaly, Hungarian Academy of Sciences (March 1979 to August 1981); Dr. F. Pessine, University of Campinas, Brazil (January 15 to March 15, 1980); Professor P. Prasad (Spring 1981); Dr. B. Guo, Lanzhou Institute of Chemical Physics, Visiting Scholar (1982−1984); Dr. G. Comtet, CNRS Fellow (1983−1984); Dr. H. Niederwald, Deutsch Forschungsgemeinshaft Fellow (1983−1984); Prof. E. Awad, American University of Beirut (1985−1987, 1988−1994); Professor H. Morita, Chiba University, Japan (1989−1990); Professor F. Froben, Freie University of Berlin (1991); Professor Ch. Bräuchle, University of Munich (1992) and (1993); Professor K.-W. Jung, WonKwang University, Korea (1994−1995).

Ph.D. Students. A. Yencha (1968); B. Ziegler (1968); D. Demeo (1969); E. Yee (1969); L. Hall (1971); D. Owens (1971); R. Chen (1972); A. Gwaiz (1972); J. Chodak (1974); E. Gossett, Jr. (1974); M. Leung (1974); R. Leyerle (1974); C. Lin (1974); M. Souto (1974); A. Wilkerson (1974); T. Akasheh (1977); A. Campion (1977); A. Merle (1978); W. Pitts (1978); D. Parker (1979); J. Terner (1979); W. Hopewell (1980); C.-L. Hsieh (1981); John Lurie (1981); J. Fukumoto (1982); R. Pandolfi (1982); J. Morgan (1983); D. Gobeli (1984); J.-J. Yang (1984); T. Corcoran (1987); D.-J. Jang (1987); R. St. Pierre (1987); T.-L. Tai (1987); C.-L. Yang (1987); D. Szaflarski (1988); L. Song (1989); H.-J. Hwang (1991); G. Lin (1992); L. Sweetman (1992); S. Wu (1992); J. Freitas (1993); N. Zhang (1993); K. Fagerquist (1994); J. Griffiths (1995).

M.Sc. Students. S. Wilt (1964); R. Lam (1974); Y. Morita (1978); L. Hashimoto (1983); J. Hanamoto (1984); E. Jackson (1990).

Biography

Professor Mostafa A. El-Sayed was born in Egypt in 1933. After completing a B.Sc. degree at Ein Shams University, Cairo, in 1953, Mostafa went to Florida State University, where he worked with Professor Raymond Sheline and then with Michael Kasha. He received his Ph.D. from Florida State University in 1959. He held postdoctoral appointments at Harvard, Yale, and The California Institute of Technology before joining the Department of Chemistry and Biochemistry of the University of California, Los Angeles in 1961. At UCLA Mostafa quickly rose through the ranks; he was promoted to Full Professor in 1967. After over thirty years of service in the UC system, Mostafa moved to the Georgia Institute of Technology in 1994 where he currently holds the Julius Brown Professorship of Chemistry and Biochemistry. During his career, Mostafa has also held appointments as a visiting university Professor at the University of Paris and the American University of Beirut and was a Sherman Fairchild Distinguished Scholar at Cal Tech.

Professor El-Sayed and his group have made outstanding contributions to many areas of chemical research, including studies of the dynamics of dissociation of gaseous molecules, reactivity of gaseous metal clusters, evaporation from gaseous ionic clusters, electronic intra- and intermolecular relaxation in condensed media, and the molecular mechanisms of solar-to-electric energy conversion in the natural photosynthetic system of bacteriorhodopsin (bR). Among the achievements of Mostafa and his group are the following: rules which explain the large variation in the rates of conversion of electronic energy into heat in many, varied systems with different types of electronic structures; time-resolved laser-line-narrowing techniques that showed for the first time the change in the mechanism of the transport of triplet excitation energy as the distance between the donor and acceptor is increased; and measurements on the picosecond-to-microsecond time scales of the dynamics of energy redistribution and laser photodissociation of gaseous molecules and ions. The El-Sayed group also showed for the first time that the size dependence of the reactivity of gaseous metal clusters can be used as a mechanistic probe and convincingly demonstrated that magic numbers in ionic clusters arise from the evaporation, rather than the formation, dynamics; the evaporation process is statistical; and evaporation of two molecules in many cases is a fission of a dimer rather than sequential evaporation of two monomers.

Mostafa's work on the understanding of the solar energy conversion mechanisms in the proton pump photosynthetic system of bacteriorhodopsin (the other photosynthetic system in nature besides that of chlorophyll) is unique and extremely important. Mostafa and his group used laser photoselection techniques to show that, unlike chlorophyll, bR does not have an antenna system. They then developed the first technique to measure laser resonance Raman spectra of femtosecond transients and showed that the first step in the energy conversion of solar energy to electric energy in this system is an isomerization process, which leads to ion pair separation. By using these measurements on mutants, he was able to elucidate the mechanism by which the protein catalyzes the photoisomerization reaction. Through a concentrated effort and by studying the kinetics of this system, its different perturbed membranes, and mutants, he and his group were able to show that the rate of the proton pumping is determined wholly by the rate of critical changes of protein conformation that are controlled by the interaction of the surface potential and the internal charges and dipoles of the amino acid residues around the active site.

During the course of these works, the El-Sayed group developed many new and important experimental techniques for probing molecular processes, including microwave-phosphorescence double-resonance spectroscopy, time-resolved laser-line-narrowing luminescence spectroscopy, picosecond and femtosecond time-resolved Raman spectroscopy, and a variety of laser mass spectrometric techniques for monitoring dynamics in ions and clusters.

Mostafa's dedication to chemistry does not stop at making pioneering and significant contributions to the science. Since 1980 Mostafa has been active in vitalizing *The Journal of Physical Chemistry* as its Editor-in-Chief. During this period, he has also served as the U.S. Editor of the *International Reviews in Physical Chemistry*.

Mostafa's scholarly contributions have received numerous distinguished recognitions. He was elected to the U.S. National Academy of Sciences in 1980 and to the Third World Academy of Sciences in 1984. He was elected a Fellow of the American Academy of Arts and Sciences in 1986. In 1985 and 1990, he was elected to the Physical Chemistry Division (as a member and an officer) of the International Union for Pure and Applied Chemistry. He was the recipient of the 1990 King Faisal International Prize in the Sciences (Chemistry). He was selected to be the 1991 UCLA Faculty Research Lecturer. He was the 1988 recipient of the Egyptian American Outstanding Achievement Award. He received the UCLA Distinguished Teaching Award, the Alfred P. Sloan and the John Simon Guggenheim Fellowships, the Fresenius National Award, the McCoy Award, the American Chemical Society California Section Award, and the Tolman Award of the Southern California Section of the American Chemical Society. In 1993, he was awarded an honorary doctoral degree by the Hebrew University in Jerusalem. He was elected a Member at Large (1985), Vice Chairman (1988), and then Chairman (1990) of the U.S. National Committee for the International Union of Pure and Applied Chemistry. He is a member of the Steering Committee for the International Center of Pure and Applied Chemistry in Trieste, Italy. He served as a member of the Board of Trustees of the University Associates (1989−1992). He was also a member of the Advisory Committee for the Chemistry Division of the National Science Foundation (1990−1993). Recently Mostafa became a member of the Board of Chemical Sciences of the National Research Council.

John D. Simon
Alan Campion
Malcolm F. Nicol

List of Publications

1. M. A. El-Sayed and R. K. Sheline, The Infrared Spectrum and Structure of Hexacyanodinickelate(I) Ion, $[Ni_2(CN)_6]^{-4}$. *J. Am. Chem. Soc.* **78**, 702 (1956).
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3. M. A. El-Sayed, P. Estrup, and R. Wolfgang. Mechanism of the Reaction of Recoil Hydrogen in the Gaseous Phase. *J. Phys. Chem.* **62,** 1356 (1958).
4. M. A. El-Sayed. A Nuclear Method for Determining Very Low Vapor Pressures. *Nucl. Instrum.* **3**, 359 (1958).
5. M. A. El-Sayed and R. K. Sheline. The Infrared Spectrum and Structure of the $[Ni(CN)_4]^{-4}$ Ion. *J. Am. Chem. Soc.* **80,** 2047 (1958).
6. M. A. El-Sayed and R. K. Sheline. The Position of the C≡N Stretching Frequency in Organic and Inorganic Molecules. *J. Inorg. Nucl. Chem.* **6**, 187 (1958).
7. M. A. El-Sayed. The Relation Between the C≡N Stretching Frequency and Hammett's σ. *J. Inorg. Nucl. Chem.* **10,** 168 (1959).
8. M. A. El-Sayed and M. Kasha. Orbital Type Interchange by Solvation and Effects on the Emission Properties of Naphthalene N-heterocyclics. *Spectrochim. Acta* **15,** 758 (1960).
9. M. A. El-Sayed, M. Kasha, and Y. Tanaka. Ionization Potentials of Benzene, Hexadeutero-benzene, and Pyridine from their Observed Rydberg Series in the 600–2000 Å. *J. Chem. Phys.* **34,** 334 (1961).
10. M. A. El-Sayed and G. W. Robinson. Excitation Transfer Splitting in the n → π^* Transitions of the Diazines. *J. Chem. Phys.* **34,** 1840 (1961).
11. M. A. El-Sayed and G. W. Robinson. Comments on a Communication by El-Sayed and Robinson. *J. Chem. Phys.* **35,** 1896 (1961).
12. M. A. El-Sayed and G. W. Robinson. Intramolecular Excitation Transfer. The Lowest n → π^* Transitions in Pyrazine. *Mol. Phys.* **4**, 273 (1961).
13. M. A. El-Sayed. The Effect of Reducing the Symmetry on the Spectra of Benzene in the 1500–2000 Å Region: Spectra of Pyridine, Pyrimidine, and Pyrazine. *J. Chem. Phys.* **36,** 552 (1962).
14. M. A. El-Sayed. The Radiationless Processes Involving Change of Multiplicity in the Diazenes. *J. Chem. Phys.* **36,** 573 (1962).
15. M. A. El-Sayed. Perturbational Enhancement of the Coupling Between the Lowest Two Electronic π,π^* States in Naphthalene. *J. Chem. Phys.* **36,** 1943 (1962).
16. M. A. El-Sayed and H. D. Kaesz. Assignment of the C≡O Stretching Absorptions in C_{4v} Metal Pentacarbonyl Derivatives. *J. Mol. Spect.* **9**, 310 (1962).
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37. K. Eisenthal and M. A. El-Sayed. Heavy-Atom Effects on Radiative and Radiationless Processes in Charge-Transfer Complexes. *J. Chem. Phys.* **42,** 794 (1965).

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53. N. K. Chaudhuri and M. A. El-Sayed. Induced Intramolecular Heavy-Atom Effects on the Phosphorescence Process by Host-Guest Crystal Interactions. *J. Chem. Phys.* **45,** 1358 (1966).
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66. M. A. El-Sayed, L. Hall, A. Armstrong, and W. R. Moomaw. Spin Polarization and Spin-Lattice Relaxation in the Lowest Triplet State of Pyrazine at 1.6 K. In *Excitons, Magnons and Phonons in Molecular Crystals*; A. B. Zahlan, Ed.; Cambridge University Press: 1968; p 125.
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