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JOSÉ MARIA SERRATOSA

2010 RECIPIENT OF THE MARILYN AND STURGES W. BAILEY DISTINGUISHED MEMBER AWARD

VICTOR DRITS



It is a great pleasure for me to introduce my friend Professor José Maria Serratosa as the 2010 recipient of the prestigious Marilyn and Sturges W. Bailey Distinguished Member Award of The Clay Mineral Society, in recognition of his outstanding contributions to clay science and his promotion of scientific research on national and international scales.

José graduated from the University of Granada in 1946 as a chemist and worked at that university as an Assistant Professor of Inorganic Chemistry. From there he accepted a fellowship to study at the University of Utrecht with Professor J. Th. Overbeek and, in 1953, he defended his PhD dissertation at the University of Madrid. José's scientific activity from 1953 until 1970 can be divided into two parts: one was his work at the National Research Council of Spain (CSIC) and the other was at various scientific centers in the United States. The experience he gained during this time ensured his successful scientific activities as well as his activities in the organization of scientific research in Spain. From 1970 to 1990 José worked at CSIC as Research Professor and since 1990 he has been Research Professor Emeritus. During this time José occupied several major positions. He was Director of Research in the Division of Science, responsible for the scientific program of this Division (1973–76). Later on (1985–87), he became Chairman of the Committee for the Promotion of Research in Material Science. From 1977 to 1979 he served as Vice-Director General of the Ministry of Education and Science of Spain, which made him responsible for the science policy of the Spanish Government. His crucial influence in the Spanish Government and the CSIC, as well as his tremendous personal efforts, greatly contributed to the promotion of Material Science in Spain. In particular, at the initiative of the Committee for the Promotion of Research in Material Science, when Serratosa was its Chairman, four new Institutes of Material Science were established in Barcelona, Madrid, Sevilla, and Zaragoza. José was the first Director of the Institute in Madrid. The creation of these Institutes was indeed an outstanding achievement.

His activity in science policy has been successfully combined with active investigations of structural features and physicochemical properties of clay minerals, in which José made several pioneering discoveries. In particular, he was one of the first to appreciate the unique advantages of spectroscopic methods for the structural study of solids.

José was the first to use infrared (IR) spectroscopy to determine the orientation of OH groups in phyllosilicates and showed that the orientation of hydroxyls differs dramatically between dioctahedral and trioctahedral clay minerals. Today this information is well known but at that time, in the 1960s, this was a pioneering discovery because it revealed for the first time that hydroxyl protons have different local environments (*i.e.* nearest oxygens and cations) depending on the di- *vs.* trioctahedral character of the clay mineral. These observations explained, for example, the origin of some peculiar

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structural features observed in dioctahedral and trioctahedral micas, and the different sensitivity of these micas to various types of external action.

José was also a pioneer in the discovery and application of the unique advantages of solid state Nuclear Magnetic Resonance (NMR) for structural study of phyllosilicates and zeolites and, in particular, for the determination of the distribution of tetrahedral Si and Al in these minerals. He showed that in the case of layer silicates this distribution obeys Loewenstein's rule, depends on the degree of substitution of Al for Si, and follows the homogeneous distribution of charge in terms of a short-range order model. This new model excluded previously postulated periodic distribution of tetrahedral Al, which was believed to control layer stacking in some swelling clay minerals.

Using a suite of different methods including NMR, José provided new insight into the structural mechanism of kaolinite-to-mullite phase transformation, in particular the origin of the exothermal peak at 980ºC, related to the presence of penta-coordinated Al.

José made a great contribution to our knowledge of the physicochemical and surface properties of clay minerals. Since his PhD, which was devoted to swelling properties of montmorillonite subjected to different pressures, José has dedicated a significant part of his professional life to developing different important aspects of the physical chemistry of clay minerals. In particular, he has paid special attention to the study of the arrangement and mechanisms of interaction of water molecules, organic ions, and other molecules in the interlayer volume of layer silicates and in the tunnels and channels of sepiolite.

In addition to all these activities, José is an enthusiastic member of the world clay science community who is actively promoting research on clay minerals. He was one of the most prominent organizers of the Spanish-Belgian Clay Meeting in 1970 and the 4th International Clay Conference in Madrid in 1972; he was editor-in-chief of the *Proceedings* of the latter conference. Now an Honorary Member of the Spanish Clay Society, José was formerly its President (1974–79). He was President (1989–93) of the International Clay Society (AIPEA), of which he was elected Fellow in 2005. Finally, he is an Honorary Member of the French Clay Group.

José has also been very active in promotion of scientific research on an international scale. In the European Union (EU), he was Spain's Representative in the Program of Material Research, Scientific Advisor for Material Research, and member of committees for the evaluation of Material Research Projects. He also coordinated one of the five projects of the "EU Peace Campus Program."

Taking into account all of these outstanding achievements, Professor Serratosa undoubtedly merits the honor of the Bailey Distinguished Member Award of CMS. To conclude, I must mention that José has many wonderful personal qualities. He is always gentle and friendly, and it is great fun talking with him. I would like to wish José good health and further success.

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