

## Research in Crystallography: Department of Crystallography & Mineralogy



The Department of Crystallography & Mineralogy (C&M) has been active for the last sixty years at the Complutense University of Madrid. Key to the initiation of modern research in the field of crystallography was the incorporation of Professor José Luis Amorós in 1956. He developed new techniques in X Ray Diffraction for the structural analysis of inorganic and organic materials, and started a research line on crystal growth that later proved to be fundamental in the more recent history of this Department. In 1962 he moved to the United States to work in material science at different research institutions. He returned in to Madrid in 1974, where he continued his brilliant career at the C&M. During this second period, he also kept working for American institutions such as the NASA.

Current research at the C&M in the field of crystallography derives in many ways from the teachings and foundations laid by Professor Amorós, and involves the following main lines in applied crystallography:

- Crystal growth of mineral phases and other inorganic compounds at low- and high-temperature. Growth mechanisms of solid solutions from aqueous solutions. Diffusing-reacting systems. Epitaxial growth on mineral surfaces. Relationships between crystal morphology and composition. Growth and characterization of materials with liquid crystal phases.
- Gemology, growth and characterization of  $\text{Al}_2\text{O}_3$  phases at high temperatures, such as ruby; growth of semiprecious stones such as turquoise from low temperature solutions.
- Selective chiral symmetry breaking during crystallization by thermodynamic-kinetic feedback near equilibrium.
- Recovery of metal phases (e.g., Al, Cd, Cr, Pb) from hazardous liquid and solid wastes by precipitation on inert mineral phases.
- Characterization of geomaterials and other inorganic compounds. Powder XRD, FT-Raman and infrared spectroscopy, SEM-EDX, TEM, and thermal analyses.

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