

MICROSTRUCTURES IN METEORITES AND COSMIC DUST, AND THEIR BEARING ON PROCESSES IN EXTRATERRESTRIAL ENVIRONMENTS

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Meteorites are extraterrestrial rocks captured by the Earth's gravitational field that survive the passage through the atmosphere to be recovered from the Earth's surface. Once considered bad omen, they represent for modern science a natural laboratory for exploring the origin and the evolution of the solar system. Most meteorites originate from asteroids and are the oldest objects available in our laboratory, dating back to the early stages of the solar system formation, ca. 4,570 Ma ago. A few other meteorites come from the Moon and planet Mars, and some may even come from comets. The study of the physical-chemical properties of meteorites thus offer important insights into processes in stars, the birth of our solar system, the formation and evolution of planets and smaller bodies.

During my lecture, I will give an overview of the microstructures in meteoritic materials, including meteorites, micrometeorites and cosmic dust. In particular I will present a selection of the most significant microstructures in chondrites, achondrites, martian and lunar meteorites, as well as the various types of micrometeorites and cosmic dust. The emphasis will be given to their bearing in the nebular versus planetary processes.

During the practical, the attendees will have a chance to check meteoritic microstructures through hand-specimen and optical microscope observations of a selection of meteorites and their polished thin sections. The goal will be the identification of a variety of meteorite types and their petrogenitic environment.