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Structural and compositional characterization of carbonaceous meteorites for clues to planet formation ANALÍA DALL'ASÉN, Department of Physics and Astronomy, Minnesota State University-Mankato, SOPHIA DIMAS, SEAN VETSCH, JORDAN GERTON, BENJAMIN BROMLEY, Department of Physics and Astronomy, University of Utah, SCOTT KENYON, Smithsonian Astrophysical Observatory — In modern planet formation theory, the process of coagulation (solids glomming together to create larger bodies from micron-size grains) is responsible for most observed planets. Simulations of rocky, gaseous and icy planet formation strengthen this understanding showing how a sea of planetesimals (the precursors to planets) of 1-100 km in radius can grow into planets. However, the origin of these objects is still unknown, and hence a complete theory of planet formation remains elusive. To understand how planetesimals formed, we study carbonaceous chondritic meteorites, considered the most primitive surviving materials from the early Solar System. These meteorites are mainly composed of chondrules (micro/millimeter-sized inclusions) surrounding by a matrix of microparticles. Here we present a study of how the structure and composition vary in different regions of the chondrules/matrix of various carbonaceous meteorites by mapping the results obtained using high-resolution micro-Raman spectroscopy, scanning electron microscopy and energy dispersive X-ray spectroscopy. Thus, we can capture details on small and large spatial scales. Finally we discuss possible interpretations of our results in terms of the astrophysical context in which the meteorites formed.

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