

Dust processing and mineralogy in protoplanetary disks

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The discovery of a large variety of exoplanetary systems in the last decade has triggered many new questions about their formation. Of particular interest is the availability of ingredients for building planets and small icy bodies in planetary systems. During the formation of stars and planetary systems, the dust, ice and gas experience a rich array of transformations in physical and chemical state. While the refractory dust provides the building block of planetary cores, ices survive in parts of the disk, providing the volatiles for atmospheres, oceans, and possible life on rocky planets. Tracing this chemical and physical evolution in its diversity requires a combination of observations from infrared (IR) to millimeter (mm) wavelengths, where dust, ice and gas have their principal spectroscopic features. In this review I present an overview of the results obtained during the last decade with major space observatories like Spitzer and Herschel and ground based facilities like the VLT and Subaru telescopes. Next to this overview of observational evidence of dust processing I will review the latest theoretical predictions and laboratory experiments and discuss the constraints the comparison between models and observations place on the transformation of circumstellar dust into a planetary system.