

THE COMPOSITION, ORIGIN AND EVOLUTION OF DUST IN CIRCUMSTELLAR AND INTERSTELLAR ENVIRONMENTS.

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Astronomical observations and analysis of stardust isolated from meteorites have revealed a highly diverse interstellar and circumstellar grain inventory, including both amorphous materials and highly crystalline compounds (silicates and carbon). In this talk we will review the dust inventory contrasting and comparing both the interstellar and circumstellar reservoirs as also the astronomical and meteoritic evidence. Interstellar dust is highly processed during its sojourn from its birthsite (stellar outflows and explosions) to its incorporation into protoplanetary systems. Of particular importance

is processing by cosmic rays in the interstellar medium and by strong shocks due to supernova explosions. The latter leads to rapid destruction due to sputtering by impacting gas ions and shattering due to grain-grain collisions. We will review theoretical calculations describing these processes and the astronomical evidence for their importance. Grains are further processed by the accretion shock upon entering the nebula and also by nebular processes such as lightning. Here, we will focus on the astronomical evidence for such processing.