Origin and Thermal Evolution of Asteroids and Their Materials

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I propose an introductory talk to TherMoPS III that reviews the current theories about the origin of the different populations of asteroids and other minor bodies, including their dynamical evolution that occurred during the early phases of the Solar System. Indeed, over the last 15 years, our understanding evolved from a static Solar System to new paradigms invoking migration of the planets and displacement of the small bodies over several astronomical units from their formation location. What are the implications of these theories for the thermal evolution of the asteroids and the materials that compose them?

This review will pay particular attention to the aforementioned question, focusing also on how the large-scale and the small-scale material mixing happend in the Solar System and on the surface of asteroids.

In addition, a lot of research in the community is devoted to undertand the so-called primitive asteroids i.e. those bodies that have low albedo, relatively featureless spectra and are expected to contain carbonaceous, organic rich materials and water. I will review current theories of the origin of these bodies, trying to tie carbonaceous near-Earth asteroids and meteorites to their parent bodies in the Main Belt, and possibly all the way back to their progenitor planetesimals as they accreted in the protoplanetary disk.

Furthermore, I will discuss the importance of understanding how the surface of asteroids, which is what we observe with telescope and space missions, has been altered over the eons by radiative heating from the sun and other space weathering agents.

Keywords: Asteroids, solar system origin, meteorites.