

Magnetic separation and identification of volatile diamagnetic solids in low magnetic field

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The separation occurred because the magnetic potential of grain at initial position was completely converted into kinetic energy at the collecting plate, and the terminal velocity of the grains there was uniquely determined by the field intensity at initial sample position and susceptibility. Here we report that the separation is extended to volatile solid such as ice Ih and solid carbon dioxide. Further more, the concentration silicate particle included in an ice grains are identified by their magnetic susceptibility that was determined from translating velocity. The method is applicable in collecting/separating the ice grains in an on-site mission to the icy rings and satellites. Both magnetic fields and dust particles are omnipresent in various regions in space. Although the field intensity is low, the cosmological time scale in space might allow specific translations of solid particles, causing chemical fractionation in the primitive materials. Reference: Hisayoshi *et al.* Sci Reps. 2010.