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Asteroid Compositional Information from Thermal-Infrared Observations

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Thermal-infrared observations are the main source of information on asteroid sizes and albedos. In many cases reflection spectra alone provide ambiguous information on asteroid mineralogy; albedos are required to remove the spectral degeneracy between classes such as E, M and P. Albedo measurements are also important for the identification of objects that may be dormant or extinct comets. A phenomenon that can complicate the mineralogical analysis of reflection spectra is space weathering. Recent thermal-infrared observations of near-Earth asteroids have provided evidence for a dependence of space weathering on size, and may provide valuable information on the timescale of space weathering. Values of thermal inertia, which is determined by the degree to which an asteroid's surface is covered in thermally-insulating, dusty material, have recently been derived for a few objects from extensive thermal-infrared observations and sophisticated thermophysical modeling. Does thermal inertia depend on composition and size? The importance of thermal-infrared observations for investigations of asteroid mineralogy, space-weathering effects, and surface properties, will be reviewed.