COMET DUST: THE VIEW AFTER HALE-BOPP

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The extensive observations of comet Hale-Bopp from the ground and space have contributed new knowledge about cometary dust. Icy grains were detected at large heliocentric distances from their infrared spectral signatures, consistent with observed OH emission. The major mineral classes of the silicate grains were identified from infrared spectra, especially the 16-35 μm ISO spectra showing strong features of crystalline olivine. Both pyroxenes and olivine are present in crystalline form as well as amorphous or glassy form. Thus, both high- and low-temperature silicates are present in cometary dust, as they are in interplanetary dust (IDPs). Polarization is also related to grain properties, and polarization images of Hale-Bopp revealed changes with position in the coma related to grain size and structure.

ISO infrared data on comet Encke clearly show a significant population of large particles, reinforcing the view that Encke has made a significant contribution to the interplanetary dust complex.

Parallel laboratory investigations of the composition and structure of IDPs at the submicron level have provided new insights into the composition and possible origin of cometary dust. Direct infrared spectra of GEMS have been obtained that show a feature similar to the amorphous component of comet silicates and to spectra of interstellar silicate dust.

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Key words: Comets, cometary dust, silicates, IR spectra, interplanetary dust

Oral presentation preferred (invited review)

I require 2 overhead projectors

unusual characters: μm Greek mu, abbreviation for micrometers