

Infrared spectra of silica polymorphs

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The existence of silica within several debris disks has been suggested. We investigated the annealing conditions of silica, and prepare various types of silica, including α -cristobalite, α -quartz, coesite, stishovite, and fused quartz, which are natural, synthetic or commercial samples.

We present a new study of both the infrared spectra (in mid- and far-wavelength regions) of relevant silica polymorphs and the conditions under which they form. We compare the results to previous studies. The interesting result of features similar to those of forsterite should be highlighted, where α -cristobalite and coesite showed similar peaks at 16, 33, and 69 μm as forsterite. The 69 μm band of α -cristobalite especially is broad and strong, and shifts largely to shorter wavelength under cooling to low temperatures. We discuss the possibility of silica detection around debris disks.