

## Refractory Grain Formation in S 19 Fireballs

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The composition, size, and number of the most refractory grains to condense in Shoemaker-Levy 9 fireballs are discussed. Chemical heterogeneity in the fireball leads to the formation of two principal types of refractory particles. Small particles consisting of a mixture of  $\text{Al}_2\text{O}_3$  and silicates are expected to form in those portions of the fireball where  $\text{C/O} < 1$ . In carbon-rich portions of the gas where  $\text{C/O} > 1$ , carbon may have condensed heterogeneously on pre-existing SiC grains. Homogeneous formation of soot through the production and agglomeration of polycyclic aromatic hydrocarbons (PAHs) does not occur. Calculations based on kinetic models indicate that the mean particle radii would be less than  $0.1 \mu\text{m}$  for both types of chemical composition. The refractory grains are small enough to have survived reentry into the Jovian atmosphere without suffering evaporation. It is suggested that they may have provided sites for the heterogeneous nucleation of more volatile species after they came to rest in the Jovian stratosphere, and therefore may comprise the cores of the dark aerosol debris particles seen suspended above the impact sites.