

## Laboratory experiments on the PAH grains with inorganic matters and their alteration by plasma

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Polycyclic aromatic hydrocarbons (PAHs) have been considered most plausible candidates of the unidentified infrared bands [1]. Therefore PAHs are presumed to be typical organic matters in space. Since organic materials affect to the nucleation, growth and crystallization of inorganic cosmic dust [2], and vice versa, the behavior of organic materials and interaction with inorganic materials should be considered. We have performed experimental studies on the formation of PAH grains with and without inorganic matters in the laboratory. The influences of the formation of PAH grains with inorganic materials were studied by transmission electron microscope observations and mid-infrared spectral measurements. In addition, cosmic dust would be undergone plasma environments during formation and growth. Therefore growth of PAH grains with and without inorganic in a plasma fields are also shown.

Pyrene (C<sub>16</sub>H<sub>10</sub>) and coronene (C<sub>24</sub>H<sub>12</sub>) were used as the materials of PAHs and silicon, magnesium and iron were used as the materials of inorganic matters. The infrared spectra of coronene grains were slightly changed by the existence of inorganic matter. In the case of pyrene grains with silicon altered by plasma, silicon carbide nanocrystallites were produced on the surface of the grains, which was observed using high-resolution transmission electron microscope. In the infrared spectrum, a broad peak at 12.5 μm was shown up. We will show further experiments and discussion on the expanding into the behavior of cosmic dusts on the poster.

### References

- [1] A. Leger, and J. L. Puget, *A&A* **137**, L5 (1984).
- [2] C. Kaito et al., *ApJ* **666**, L57 (2007).