# Measurement of Noble Gases in SiC Coated Diamond Particles

# Takayuki Fujimoto[1], Jun-ichi Matsuda[2], Yoshiaki Morisada[3], Yoshinari Miyamoto[4]

[1] Earth and Space Sci., Osaka Univ, [2] Earth and Space Sci., Osaka Univ., [3] JWRI, Osaka Univ., [4] JWRI, Osaka Univ

http://psmac0.ess.sci.osaka-u.ac.jp/matsudalab-j.html

SiC grains in meteorites have many isotopic anomalies, showing the signature of the astrophysical s-process (neutron capture on a slow time scale), and thus pointing to an origin in red giant carbon stars, or AGB stars. It appears that the SiC grains are pristine circumstellar condensates from such stars. Otherwise, SiC particles possibly formed in high temperature areas of the primitive solar nebula, with the reaction of silicate component and the carbon with isotopic anomaly.

Recently, Miyamoto et al. (2000) have succeeded in coating a SiC layer, several tens of nanometers in thickness, onto a diamond particle. The reaction of SiO vapor and diamond surface was carried out at optimized temperature of 1350 C in vacuum. The oxidation of these SiC/Dia powders is at least 150 C higher than that of the raw material diamond.

The same process possibly occurred when SiC grains were produced in the solar nebula, suggesting the existence of sub structural particles like SiC/Dia.

The nature of phase-Q, the carrier of planetary heavy noble gases in carbonaceous chondrites, is still unknown. Matsuda et al. (1999) observed a strong relation of phase-Q with presolar diamonds. In view of this, it seems mysterious that the release temperatures of Q-gases during pyrolysis lie between 1000-1200 C which is about 200 C higher than those of presolar diamonds. Here, we think of the possibility that the coated material is completely different from diamonds. The plausible candidate is SiC.

In this study, we have synthesized coated diamonds with SiC thin film at 1350C for 30 min in noble gases atmosphere at about 0.2atm. The components of the ambient noble gases were He 1%, Ne 1%, Ar 97.8%, Kr 0.1% and Xe 0.1%, respectively. We have measured the elemental abundances and isotopic compositions of noble gases trapped in the SiC/Dia, the raw diamond powders and the diamond heated at 1350 C in noble gas atmosphere. We will discuss the process of the formation of SiC particles.