

Which does stabilize diamond over graphite in the diamond CVD process, atomic hydrogen or electric charge?

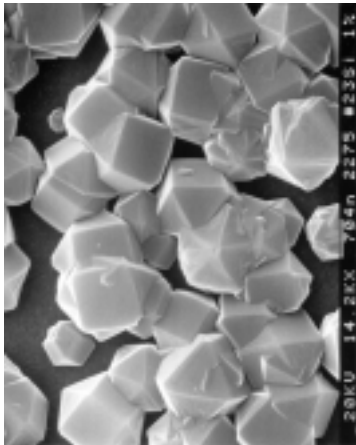
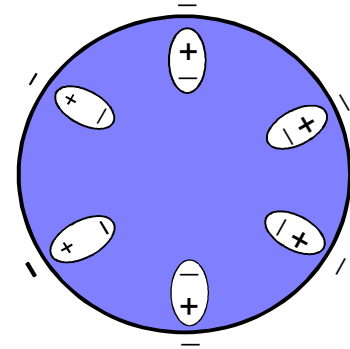
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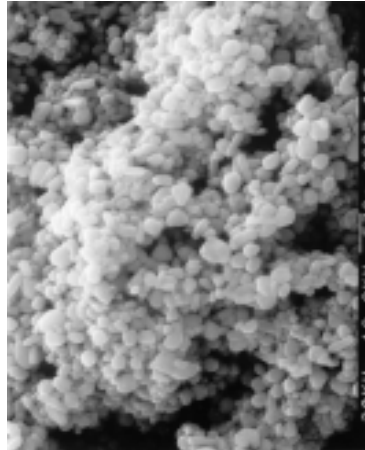
Korea Research Institute of Standards & Science

ICNDST-8, July 21-26, 2002, Univ. Melbourne

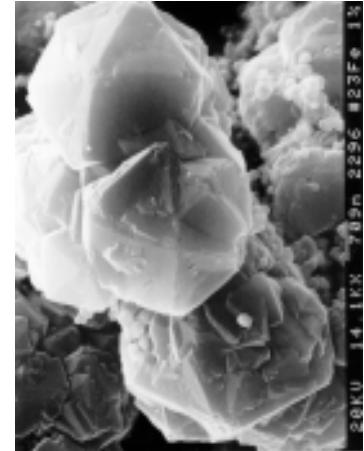
Electrical double layer stabilizes
a dielectric diamond cluster
over a conducting graphite cluster.



(a) Si substrate



(b) Fe substrate



(c) Fe substrate
on quartz

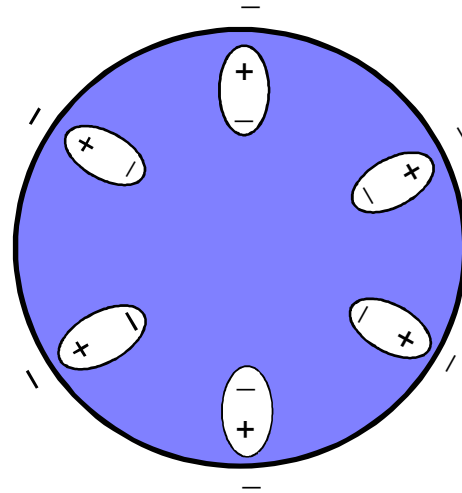
Electrical Double Layer

at the charged interface

If dielectric nuclei (diamond) are electrically charged, they are stabilized by an electrical double layer.

However, conducting graphite clusters cannot make an electrical double layer.

Stabilization of diamond nuclei comes from both capillary pressure of small size and the electric charge.



For more details,
see the references:
Jang and Hwang,
J. Mater. Res. 13 (1998) 3527
J. Mater. Res. 13 (1998) 3536

Conclusions

Ion-induced dipole interaction arising from the electrical double layer stabilizes a **dielectric diamond** cluster over a **conducting graphite** cluster.