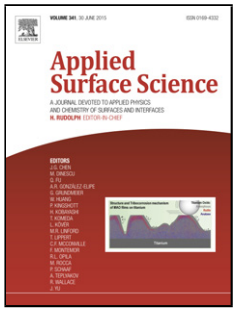

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PII: S0169-4332(17)32595-3
DOI: http://dx.doi.org/10.1016/j.apsusc.2017.08.237
Reference: APSUSC 37074

To appear in: *APSUSC*

Received date: 7-6-2017
Revised date: 28-8-2017
Accepted date: 31-8-2017

Please cite this article as: M.Allenbach, M.B.Neuland, A.Riedo, P.Wurz, Scattering of Low-Energetic Atoms and Molecules from a Boron-doped CVD Diamond Surface, Applied Surface Sciencehttp://dx.doi.org/10.1016/j.apsusc.2017.08.237

Scattering of Low-Energetic Atoms and Molecules from a Boron-doped CVD Diamond Surface

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Keywords: Low energetic atom imaging, Chemical vapor deposition diamond, Charge state conversion surface, Ion scattering, Laser ablation ionization mass spectrometer, Space research

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Highlights

1) B-doped synthetic diamond surface successfully tested for space application.

2) Angular scatter of low-energy H and O ions is less than that of other synthetic diamond samples.

3) Boron-doping allowed preventing electrostatic charging of synthetic diamond material.

Abstract

For the detection of low energetic neutral atoms for the remote sensing of space plasmas, charge state conversion surfaces are used to ionize the neutrals for their subsequent measurement. We investigated a boron-doped Chemical Vapor Deposition (CVD) diamond sample for its suitability to serve as a conversion surface on future space missions, such as NASA's Interstellar Mapping and Acceleration Probe.

For H and O atoms incident on conversion surface with energies ranging from 195 to 1000 eV and impact angles from 6° to 15° we measured the angular scattering distributions and the ionization yields. Atomic force microscope and laser ablation ionization mass spectrometry analyses were applied to further characterize the sample. Based on a figure-of-merit, which included the ionization yield and angular scatter distribution, the B-doped CVD surface was compared to other, previously

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