

Abstract Submitted
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Possible detection of surface melting on solid hydrogen by TOF-SIMS TAKU SUZUKI, National Institute for Materials Science — The molecular hydrogens form the simplest of all molecular solids. Thus, the irradiation effect of ion beams on quench-condensed hydrogen film is conceptually the simplest of all molecular condensed systems and therefore is an ideal benchmark system for testing theories. However, the number of studies concerning ion beam irradiation effect on solid hydrogen is quite limited. In the present study, we have investigated secondary ion emission from quench-condensed hydrogen films under ion beam irradiation. To prepare the quench-condensed hydrogen films, we developed ultra-high vacuum (UHV) – compatible cryostat, which enables sample cooling to 4 K. The UHV chamber was equipped with an ion gun with an electrostatic deflector for chopping and an electrostatic energy analyzer. The continuous 2 keV He⁺ ion beam was utilized for ion scattering spectroscopy (ISS), while the ion beam was chopped for time-of-flight secondary ion mass spectroscopy (TOF-SIMS). The sample was prepared by the exposure of a polycrystalline We found the enhancement of the H⁺ ion emission with decreasing the sample temperature. The enhancement of the secondary H⁺ ion emission is most likely related with the solid-liquid phase transition.

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