SF-P006

스테인리스스틸 표면에 두꺼운 부동태 피막형성

권혁채, 나동현, 홍만수, 한승진, 하태균, 박종도

포항가속기연구소

가속기 건설과 운영 기반기술을 접목시켜 일반적인 진공 소재로 많이 사용되는 스테인리스강에 두꺼운 크롬산 피막을 형성하여 극 고진공용 우주환경 모사용으로 적용 가능한 표면처리에 대해서 알아보았다. 산 처리제를 사용한 부동태피막 형성 방법, 전해연마에 의한 방법, 전해연마 부동태 피막형성 후 다시 산 처리제에 침전하는 방법을 비교하였다. 본 발표에서는 인위적으로 강하고 두꺼운 크롬산 피막을 형성하는 방법을 제시하고 그 방법에 따른 크롬 산화층 두께 변화를 관찰하였다.

Keywords: Passivation, chrome oxide, UHV, surface treatment

SF-P007

Study of Self-assembled Organic Layer Formation at the HATCN/Au Interface

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We elucidate the mechanism of the self-assembled organic layer formation at the organic/metal interface of hexaaza-triphenylene-hexacarbonitrile (HATCN)/Au(111) by first-principles calculations and Low-temperature scanning tunneling microscope (STM). In this work, we used HATCN to deposit organic material which is well known as an efficient OLED charge generation material. Low-temperature STM measurements revealed that self-assembled hexagonal porous structure is formed at terraces of Au(111). We also found that the hexagonal porous structure has chirality and forms only small (<1000 nm^2) phase-separated chiral domains that can easily change their chiral phase in subsequence STM images at 80 K. To explain the mechanism of these observation, we calculated the molecular-molecular and molecule-surface interaction energies by using density functional theory method. We found that the change of their chiral phase resulted from the competition between the two energies. These results have not only verified our experimental observations, but also revealed the delicate balance between different interactions that caused the self-assembed structures at the surface.

Keywords: HATCN, STM, DFT, interface