水素による異方性エッチングに及ぼすグラフェン結晶構造の影響

Influence of Graphene Crystals Structures on Hydrogen Induced Anisotropic Etching Process

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Hydrogen induced etching of graphene is of significant interest to understand graphene growth process as well as to fabricate nanoribbons and various other structures. Here, we demonstrate the influence of graphene crystals structures on the hydrogen induced etching behavior. Graphene crystals were synthesized on electro-polished Cu foil by an atmospheric pressure (AP) chemical vapor deposition (CVD) process. We observed growth of hexagonal shaped dendritic graphene along with regular graphene crystals. Significant differences in hydrogen induced etching behavior were observed for the snowflake-dendritic and regular graphene crystals by annealing in a gas mixture of hydrogen and argon. The regular graphene crystals were etched anisotropically creating hexagonal holes with pronounced edges, while dendritic crystals creates symmetrical fractal structures. Graphene nanoribbons, and Y-junctions structures were obtained with controlled hydrogen-induced anisotropic etching of regular graphene crystals. The etching behavior provides important clue of graphene nucleation and growth as well as their selective etching to fabricate well-defined structures for nanoelectronics.

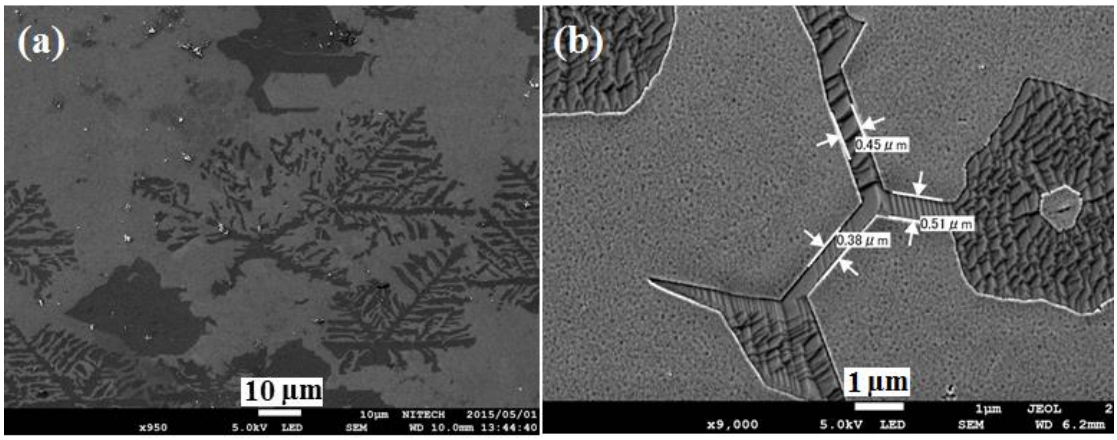

Fig. 1 (a) Etching behavior of dendritic and regular graphene crystals on Cu foil (b) Formation of graphene Y-junctions structures by anisotropic etching.

Reference

[1] S. Sharma, G. Kalita, M. Tanemura et al. Carbon 75, 277–280, (2014).

[2] G. Kalita, S. Sharma, M. Tanemura et al. Carbon 80, 504–512, (2014).

[3] P. Remi, G. Kalita, M. Tanemura et al. RSC Advance 5, 35297-35301, (2015).

[4] A. Thangaraja, G. Kalita, K. P. Sharma, M. Tanemura et al. Appl. Phys. Letts., in press, (2015).