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Twisted Carbon Nanofibers Synthesized using Ni-MgO Catalyst Treated by Mechanochemical Process

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Twisted carbon nanofibers (CNFs) with uniform diameter and controlled size were synthesized in large scale by catalytic decomposition of acetylene with Ni-MgO catalyst treated by Mechanochemical (MC) process The distribution and size of Ni catalyst can be governed by tuning grinding time using MC process As a result, size and structure of CNFscan be controlled.

$Ni(OH)_2$ and $Mg(OH)_2$ were used as the starting materials to prepare catalyst, and the mol ratio of Ni and Mg was 1 1 They were well mixed using MC process in a mixer mill (MM200, Retsch)for 180 and 360 min. The resulted catalyst was used to decompose acetylene by CVD at 500–650°C Morphology and size of as-grown CNFs were characterized via SEM using a phillips XL 30S FEG instrument and TEM using a Phillips TEC F20 instrument.

SEM images show that the skin of CNFs is rough and the morphology of CNFs becomes to twisted-formation after catalyst was treated using MC process for 180 and 360 min. The diameter of as-grown CNFs decreases with the grinding time increase. HRTEM image shows that there are protuberant edges in the CNFs with twisted-formation, and the distance between centers of two protuberant edges is about 8 nm, where, in result, is suitable to locate for loading catalyst particle

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폴리카보실란을 이용한 SiC Foam 제조 및 특성 평가

Preparation and Characterization of SiC Foam using a Polycarbosilane

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에너지 환경산업 등에서 경량 내열 소재의 수요가 증가하고 있으며 이러한 소재들로는 carbon, SiC, SiCN, SiCBN 등으로 저온용 복합재료로부터 초고온용 복합재료에 이르기 까지 다양하게 개발되고 있다 그 중 탄소재료는 500°C 이상의 고온에서 산화반응에 의하여 급격하게 강도가 저하되는 단점을 가지고 있어 최근에는 1200°C 이상의 고온에서도 강도의 저하가 일어나지 않는 SiC에 기초를 둔 소재들이 많이 연구되고 있다 본 연구에서는 고분자 전구체인 폴리카보실란을 출발물질로하여 polyurethane template를 사용하여 SiC foam을 제조하였다 폴리카보실란을 핵산에 녹여 polyurethane template에 함침한 후 excess 폴리카보실란을 제거하고 건조한 후 200°C에서 불용화처리를 하고 600°C에서 polyurethane을 제거 하였다 다시 1200–1400°C에서 열처리하여 SiC foam을 얻었으며 XRD, SEM, TEM, TGA, IR을 사용하여 폴리카보실란으로부터 SiC foam을 제조과정을 관찰하였다