化工学报 2009 60 (9): 2404-2408 ISSN: 0438-1157 CN: 11-1946/TQ

材料化学工程与纳米技术

微波等离子体法合成重油残渣基定向纳米碳薄膜

杨永珍，郭明聪，刘旭光，许并社

新材料界面科学与工程教育部重点实验室(太原理工大学); 太原理工大学材料科学与工程学院;太原理工大学化学化工学院

收稿日期 2009-1-4 修回日期 2009-5-8 网络版发布日期 2009-9-11 接受日期

摘要 以重油残渣为原料，采用微波等离子法制备了一种结构新颖的定向纳米碳薄膜材料。经场发射扫描电子显微镜、高分辨透射电子显微镜分析，结果表明：产物纯度较高，外观呈条状麦穗形，各条状物平行排列形成定向阵列，最大宽度约为65nm，长度可达900nm左右；麦穗的主干表层和穗片晶化程度较好，层与层之间清晰可见，中心部位为非晶态，可能是产物经历了由外向内的生长过程，重油残渣中的重金属Ni、Fe等对其生长起了一定的催化作用。

关键词

重油残渣 微波等离子体法 定向纳米碳薄膜

分类号

Preparation of oriented carbon films from heavy oil residue by microwave plasma

YANG Yongzhen,GUO Mingcong,LIU Xuguang,XU Bingshe

Abstract

Oriented carbon films with novel structure were prepared by microwave plasma from heavy oil residue.The prepared films were characterized by field emission scanning electron microscopy, high resolution transmission electron microscopy, X-ray powder diffraction and Raman spectroscopy.The products were formed with high purity, and oriented as the shape of a strip-like wheat spike.The outer layers of the spike have a higher degree of crystallization, the maximum width and length are about 65 nm and 900 nm, respectively, while the central parts are amorphous.It was suggested that the products experienced a process from outer to inner growth.Some metals existed in the deoiled asphalt, such as Ni and Fe, may contribute as catalyst to the aligned carbon film growth.

Key words

heavy oil residue microwave plasma oriented carbon film

DOI:

通讯作者 刘旭光 Liuxuguang@tyut.edu.cn