Title (en)

BULK PREPARATION OF HOLEY CARBON ALLOTROPES VIA CONTROLLED CATALYTIC OXIDATION

Title (de)

MASSENHERSTELLUNG LÖCHRIGER KOHLENSTOFFALLOTROPE DURCH GESTEUERTE KATALYTISCHE OXIDATION

Title (fr)

PRÉPARATION EN MASSE D'ALLOTROPES PERFORÉS DU CARBONE PAR OXYDATION CATALYTIQUE CONTRÔLÉE

Publication

EP 3038976 A4 20170419 (EN)

Application

EP 13892744 A 20130828

Priority

US 2013000198 W 20130828

Abstract (en)

[origin: WO2015030698A1] A scalable method allows preparation of bulk quantities of holey carbon allotropes with holes ranging from a few to over 100 nm in diameter. Carbon oxidation catalyst nanoparticles are first deposited onto a carbon allotrope surface in a facile, controllable, and solvent-free process. The catalyst-loaded carbons are then subjected to thermal treatment in air. The carbons in contact with the carbon oxidation catalyst nanoparticles are selectively oxidized into gaseous byproducts such as CO or C02, leaving the surface with holes. The catalyst is then removed via refluxing in diluted nitric acid to obtain the final holey carbon allotropes. The average size of the holes correlates strongly with the size of the catalyst nanoparticles and is controlled by adjusting the catalyst precursor concentration. The temperature and time of the air oxidation step, and the catalyst removal treatment conditions, strongly affect the morphology of the holes.

IPC 8 full level

C01B 32/05 (2017.01); **C01B 32/168** (2017.01); **C01B 32/194** (2017.01); **C01B 32/20** (2017.01); **H01M 4/02** (2006.01); **H01M 4/13** (2010.01); **H01M 4/583** (2010.01)

CPC (source: EP KR US)

C01B 32/05 (2017.08 - EP KR); **C01B 32/152** (2017.08 - KR); **C01B 32/159** (2017.08 - KR); **C01B 32/16** (2017.08 - KR); **C01B 32/168** (2017.08 - EP); **C01B 32/184** (2017.08 - KR); **C01B 32/194** (2017.08 - EP US); **C01B 32/198** (2017.08 - KR); **C01B 32/205** (2017.08 - KR); **C09C 1/48** (2013.01 - KR); **D01F 9/12** (2013.01 - KR); **H01B 1/04** (2013.01 - KR)

Citation (search report)

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- See also references of WO 2015030698A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

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