

Title (en)
PROCESS FOR THE PREPARATION OF HIGHLY POROUS CARBON FIBERS BY FAST CARBONIZATION OF CARBON PRECURSOR FIBERS

Title (de)
VERFAHREN ZUR HERSTELLUNG HOCHPORÖSER KOHLENSTOFFFASERN DURCH SCHNELLE KARBONISIERUNG VON KOHLENSTOFFVORLÄUFERFASERN

Title (fr)
PROCÉDÉ DE PRÉPARATION DE FIBRES DE CARBONE HAUTEMENT POREUSES PAR CARBONISATION RAPIDE DE FIBRES PRÉCURSEURS DE CARBONE

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Abstract (en)
The present invention is related to highly porous carbon fibers, to a process of manufacturing such highly porous carbon fibers based on fast carbonization of carbon precursor fibers, and to the use of such highly porous carbon fibers. The process of manufacturing highly porous carbon fibers according to the present invention comprises a stabilization step, wherein carbon precursor fibers are heated in an oxidizing or non-oxidizing atmosphere at temperatures in the range of from 200 to 500 °C, and a pyrolysis step, wherein the such treated carbon precursor fibers are heated in a non-oxidizing atmosphere at temperatures above those of the stabilization step via laser induced heating, microwave heating, or assisted plasma heating, wherein the heating rate in the pyrolysis step is from 5 to 500 K/s, respectively. The obtained highly porous carbon fibers have a surface area in the range of from 100 to 2500 m²/g, and a pore diameter in the range of from 0.1 to 10 nm. The highly porous carbon fibers according to the present invention are ideally suited as a composite material, as an electrode material and/or an electrode coating, as an adsorbent, as a filtration medium, as a catalyst support. Moreover, the highly porous carbon fibers according to the present invention are particularly applicable in charge storage, gas storage, filtration and adsorption devices.

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Citation (applicant)
• EP 0698935 A1 19960228 - MCCULLOUGH FRANCIS P [US]
• EP 1813701 A1 20070801 - BRIDGESTONE CORP [JP]
• US 3699210 A 19721017 - BINNING ROBERT C, et al
• DE 10057867 C1 20020214 - FREUDENBERG CARL KG [DE]
• US 2011158895 A1 20110630 - WANG CHIH-YUNG [TW], et al
• US 2011079505 A1 20110407 - WHITE TERRY L [US], et al
• US 2012189877 A1 20120726 - FERRARIS JOHN P [US], et al
• US 2007134151 A1 20070614 - JO SEONG-MU [KR], et al
• US 2010081351 A1 20100401 - HONG SOON HYUNG [KR], et al
• EP 1375707 A1 20040102 - SGL CARBON AG [DE]
• US 2007142225 A1 20070621 - BAKER FREDERICK S [US]
• CN 102691136 A 20120926 - CAS GUANGZHOU CHEMISTRY CO LTD
• CA 2619829 A1 20070301 - ISTVAN RUDYARD LYLE [US]
• US 5521008 A 19960528 - LIEBERMAN ALEXANDER I [RU], et al
• EP 0927778 A1 19990707 - PETOCA LTD [JP]

Citation (search report)
• [XDI] US 3699210 A 19721017 - BINNING ROBERT C, et al
• [XD] US 2010081351 A1 20100401 - HONG SOON HYUNG [KR], et al
• [A] US 4370141 A 19830125 - LEE SHU M, et al

Cited by
CN112670522A; CN109457302A; CN112337193A; CN114506841A; CN115335466A; CN112967889A; CN107697913A; CN110541210A; CN112342644A; CN114990735A; US2019256359A1; CN111647974A; CN107858829A; CN110629326A; CN113930927A; CN115609709A; CN110054177A; CN113699694A; CN114351294A; WO2021127332A1

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