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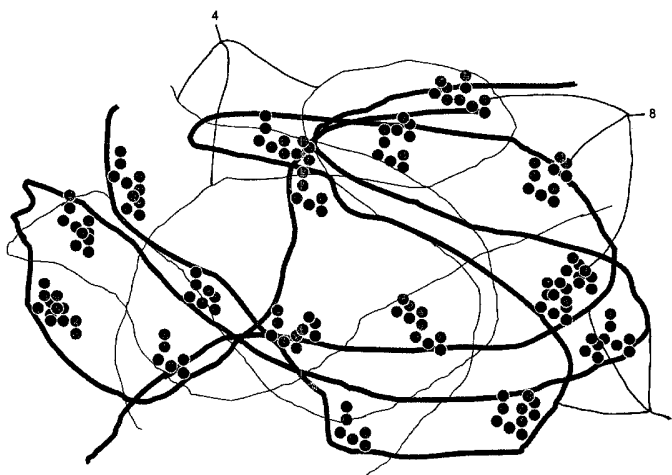
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(54) Title: MICROPOROUS, MIXED POLYMER PHASE MEMBRANE



(57) Abstract: A freestanding, microporous membrane includes a mixed polymer phase matrix having a first polymeric phase comprising a polyolefin interconnected with a second polymeric phase comprising a fibrillated fluoropolymer. A siliceous material is dispersed throughout the mixed polymer phase matrix. A method of forming the membrane of the present invention involves combining a siliceous material, a fluoropolymer capable of processing-induced fibrillation, and a polyolefin to form a mixture and subjecting the mixture to sufficient shear force during processing and extruding the effect fibrillation of the fluoropolymer and thereby form the interconnected mixed polymer phase matrix. The membrane is useful in a variety of products, including labels (printed and imprinted) and separators in energy storage devices, such as batteries, capacitors, and fuel cells. Figure 1 is a schematic diagram of the microporous membrane, which includes siliceous material dispersed throughout a mixed polymeric phase matrix.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/15287

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01M 2/16; B32B 3/26, 5/16
 US CL : 429/252; 428/315.5, 319.7, 319.9, 331; 264/41, 175

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 429/252; 428/315.5, 319.7, 319.9, 331; 264/41, 175

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,196,262 A (SCHWARZ et al) 23 March 1993 (23.03.1993), column 1, lines 51-68; column 3, lines 59-60.	1-16
Y	US 5,009,971 A (JOHNSON et al) 23 April 1991 (23.04.1991), column 2, lines 17-24; column 3, lines 27-35; column 4, lines 62-67.	1-18

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See patent family annex.

* Special categories of cited documents:	"T"
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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