

Title (en)

ELECTROSPUN NANOFIBROUS POLYMER MEMBRANE FOR USE IN PERSONAL PROTECTIVE EQUIPMENT

Title (de)

ELEKTROGESPONNENE NANOFASERPOLYMERMEMBRAN ZUR VERWENDUNG IN EINER PERSÖNLICHEN SCHUTZAUSRÜSTUNG

Title (fr)

MEMBRANE POLYMÈRE NANOFIBREUSE ÉLECTROFILÉE DESTINÉE À ÊTRE UTILISÉE DANS UN ÉQUIPEMENT DE PROTECTION PERSONNEL

Publication

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Application

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Priority

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Abstract (en)

[origin: WO2021202820A1] An electrospun polymer nanofibrous membrane that provides high filtering efficiency and excellent porosity is disclosed herein. The membrane may be treated with one or more antimicrobial or antiviral agents. The treatment may preferably be a coating of one or more antiviral agents on the surface of the membrane. Alternatively, one or more antiviral agents may be impregnated into the nanofibrous membrane. The membrane may additionally or alternatively be impregnated with one or more metal-organic frameworks (MOFs). The membrane has a high filtering efficiency and sufficient porosity to provide breathability characteristics. The membrane is suitable for use in making facemasks and respirators that are highly resistant to infectious pathogens and/or other small particulates.

IPC 8 full level

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CPC (source: EP KR US)

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Citation (search report)

- [XYI] US 2018117370 A1 20180503 - SEO IN YONG [KR], et al
- [XYI] US 2013291878 A1 20131107 - TAKAYAMA SHINJI [JP], et al
- [Y] US 2016015098 A1 20160121 - CONLON MATTHEW [US]
- [Y] CUI HONGMIN ET AL: "Multilevel porous structured polyvinylidene fluoride/polyurethane fibrous membranes for ultrahigh waterproof and breathable application", COMPOSITES COMMUNICATIONS, vol. 6, 1 November 2017 (2017-11-01), pages 63 - 67, XP093052359, ISSN: 2452-2139, Retrieved from the Internet <URL:https://pdf.sciencedirectassets.com/313916/1-s2.0-S2452213917X00041/1-s2.0-S2452213917300748/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEBAwCXVzLWVhc3QtMSJHMEUCIQCzg1gPhBJMQEsg6g93YrVjLjgQafn5E5kyCmx49Y3aglgXrlpQVLDfZfE4N5FiWQRRyCyc9hNbzdDjy0> [retrieved on 20230612], DOI: 10.1016/j.coco.2017.10.002
- [Y] BAJI AVINASH ET AL: "Emerging Developments in the Use of Electrospun Fibers and Membranes for Protective Clothing Applications", POLYMERS, vol. 12, no. 2, 24 February 2020 (2020-02-24), pages 492, XP055905543, DOI: 10.3390/polym12020492
- [XY] LEE SEUNGSI: "Developing UV-protective textiles based on electrospun zinc oxide nanocomposite fibers", FIBERS AND POLYMERS, vol. 10, no. 3, 1 June 2009 (2009-06-01), Seoul, pages 295 - 301, XP093052386, ISSN: 1229-9197, Retrieved from the Internet <URL:http://link.springer.com/article/10.1007/s12221-009-0295-2/fulltext.html> [retrieved on 20230612], DOI: 10.1007/s12221-009-0295-2
- [YP] CHOWDHURY MOHAMMAD ASADUZZAMAN ET AL: "Prospect of biobased antiviral face mask to limit the coronavirus outbreak", ENVIRONMENTAL RESEARCH, ACADEMIC PRESS, SAN DIEGO, CA, US, vol. 192, 3 October 2020 (2020-10-03), XP086392438, ISSN: 0013-9351, [retrieved on 20201003], DOI: 10.1016/J.ENVR.2020.110294
- [X] VANANGAMUDI ANBHARASI ET AL: "Synthesis of hybrid hydrophobic composite air filtration membranes for antibacterial activity and chemical detoxification with high particulate filtration efficiency (PFE)", CHEMICAL ENGINEERING JOURNAL, vol. 260, 17 September 2014 (2014-09-17), AMSTERDAM, NL, pages 801 - 808, XP093052436, ISSN: 1385-8947, Retrieved from the Internet <URL:https://pdf.sciencedirectassets.com/271942/1-s2.0-S1385894714X00203/1-s2.0-S1385894714011164/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEBAwCXVzLWVhc3QtMSJHMEUCIDKtXlV+nUzSaGxCnjhh92LQJm/cSPQgbT6LVsEh5L+wAiAC9r0lCKdgD+HKNSjgxcYDRlftm1Nk7rOMcrySeHlvqzBQhaEAUaDDA1OTAwMzU0Njg2NSIMoiAla1ecjzBfAa8YK> [retrieved on 20230612], DOI: 10.1016/j.cej.2014.08.062
- [XY] ABDULKAREEM MELAIYE ET AL: "Silver(I)-Imidazole Cyclophane gem-Diol Complexes Encapsulated by Electrospun Tecophilic Nanofibers: Formation of Nanosilver Particles and Antimicrobial Activity", JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, vol. 127, 1 January 2005 (2005-01-01), pages 2285 - 2291, XP007921351, ISSN: 0002-7863, [retrieved on 20050129], DOI: 10.1021/JA040226S
- See also references of WO 2021202820A1

Designated contracting state (EPC)

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