

HYDROGEL BLANKETS

Description

The novel method of preparation of microporous hydrogel reinforced using the polypropylene network with a high rate of swelling in aqueous media has been developed using previously developed techniques of formation of hydrogels covalently attached to the polypropylene network and techniques of formation of microporous hydrogels carried out at the Department of Organic Chemistry, National University "Lviv Polytechnic". Hydrogel grafting to the polypropylene fiber allows conducting of the necessary technological stages during production and application of hydrogel cloths (blankets) - dehydration, sterilization, and loading with drugs. The structure of reinforced hydrogel advantageously differs from the existing on the market hydrogel products. The proposed technology is patentable.

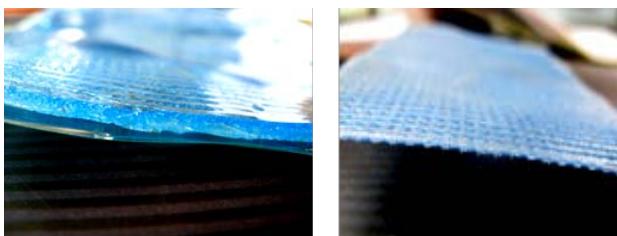


Fig.1. The fragment of hydrogel blanket in a dried and swollen state.

Innovative Aspect and Main Advantages

The main disadvantage of hydrogel blankets, especially with high swelling rate is low physical and mechanical properties. This fact significantly restricts the possible use of such products. Hydrogel reinforcement using the polypropylene network completely eliminates this disadvantage and allows to form a material with significant physical and mechanical properties. High physical and mechanical properties of hydrogel blankets with polypropylene network allow providing the hydrogel with a wide range of properties, such as a high absorption capacity at the high swelling rate.

Areas of Application

The combination of high mechanical properties and the significant swelling rate allows forming of hydrogel blankets of a large area. This product is required especially in the case of extensive burns damage during emergencies. It is well known that in the case of extensive damages, a lot of victims die as a result of an inability to provide necessary assistance in time due to pain shock and dehydration. Hydrogel blankets of the large area can solve this problem almost completely. The use of such blankets provides local anesthesia (thus, the painful shock can be avoided), ensures the regulation of water balance of damaged areas while maintaining air access and prevents overheating of the body. In addition, bacteriostatic properties suspend necrotic processes. In

other words, the blanket can replace damaged skin and prevent fatal for at least 5-8 hours. Hydrogel pain-relieving and hemostatic bandages for military medicine can be developed using the present invention. For these purposes, materials should possess high mechanical properties as they will be used in a field, where the use of ordinary hydrogel dressings is almost impossible.



Fig.2. The fragment of hydrogel blanket applied to the skin

Stage of Development

- The innovation is holistic research work confirmed by a number of patents of Ukraine:
- 1. UA Patent № 85990C2, МПК C 08 J 7/00. N-[(alkyl(aralkyl)peroxy)-methyl]acrylamides as peroxide monomers.
- 2. UA Patent № 46481A, МПК C 08 J 007/12. Polymer surface modification technique.
- 3. UA Patent №53072A, МПК C 08 J007/12. Polymer surface modification technique.
- 4. UA Patent № 88594C2 (51) МПК(2009), A 61 L 15/00. Hydrogel bandage for the treatment of burn and trophic wounds.
- The pilot lot of hydrogel samples has been produced. Hydrogel bandages on polypropylene fabric for the treatment of burn wounds have passed preclinical and clinical trials. The pilot production of medical hydrogel dressings is running (6000 bandages per month).
- The stage of the patenting.

Contact Details

Lviv Polytechnic National University

Stanislav Voronov

Phone +38 032258-25-50 (work)

E-mail: stanislav.voronov@gmail.com

Volodymyr Samaryk

Phone +380676745136

E-mail: volodymyr.y.samaryk@lpnu.ua