

Nanochemistry and biotechnology

The polymer hydrogels based on the cross-linked polyacrylamides as dressing materials

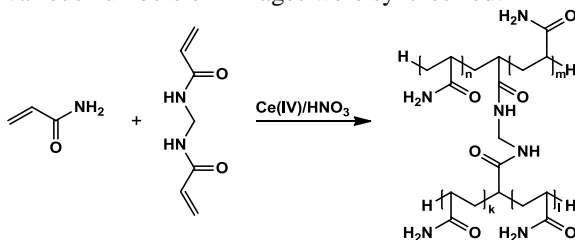
O. Nadтока^{*}, T. Nazarova, N. Kutsevol

Taras Shevchenko National University of Kyiv, 64, Volodymyrska str., Kyiv 01033, Ukraine.

E-mail: oksananadtoka@ukr.net

Skin generally needs to be covered with a suitable dressing immediately after it is damaged. Unfortunately, there is no single suitable for all types of wounds; therefore, to design an effective wound dressing the condition of wound and its surrounding skin should be considered. High performance wound dressings should provide enable effective oxygen circulation, absorbing excess exudates from the wound without leakage to the surface of dressing and allowing water vapor transmission at an effective rate to prevent wound desiccation. Polymeric hydrogels of natural and synthetic nature are promising materials for this purpose.

In our work the synthesis and study of physical and chemical properties of chemically cross-linked hydrogels based on acrylamide were carried out. Cerium-ion-induced (Ce(IV)/HNO₃) redox initiation method was used for the synthesis of the polyacrylamide. Polyacrylamide was cross-linked due to linking agent N,N'-methylene-bis-acrylamide of different concentration and series of copolymers of various numbers of linkages were synthesized.



The equilibrium water absorption (EWA%) and the equilibrium water content (EWC%) were studied for all the prepared samples. Chemically cross-linked polymers is characterized by satisfactory mechanical properties, chemical and thermal resistance, high ability to absorb water, therefore they should be perspective materials for nanochemistry and nanotechnology (as nanoplatforms or matrices for metal nanoparticle preparation); for biomedical (drug delivery) and technological (manufacture of wound dressings) applications.