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Preparation and analysis of the properties of nanoparticles based on amphiphilic poly-*N*-vinyl-2-pyrrolidone

© **Andrey N. Kuskov**,[1] **Pavel P. Kulikov**,[2] **Sophia S. Babkina**,[1] and **Mikhail I. Shtilman**[2]
[1] *Moscow State University of Engineering (MAMI). Semenovskaya St., 38. Moscow, 107023. Russia. Phone: +7 916-722-6100. E-mail: a_n_kuskov@mail.ru*
[2] *D.I. Mendeleev Russian Chemical-Technological University. Miusskaya Sq., 9. Moscow, 125047. Russia. Phone: +7 905-781-9722. E-mail: p.kulikov.p@gmail.com*

*Supervising author; +Corresponding author

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Abstract

To produce nanosized particles in an aqueous solution amphiphilic derivatives of poly-*N*-vinyl-2-pyrrolidone (Amf-PVP) were synthesized with different molecular weight of hydrophilic PVP-moiety and one terminal linear alkyl hydrophobic moiety. To explore the possibility of using Amf-PVP as carriers for pharmaceuticals there were obtained micelle particles based on model substances. As model preparations there were selected non-steroidal antiinflammatory agents – indomethacin and broad-spectrum antibiotic – rifabutin. The micellar particles were prepared using the ultrasonic method, followed by evaporation of the organic solvent (emulsion method). Medium size, size distribution and ζ-potencial of particles were determined by dynamic light scattering. For micellar particles of indomethacin the average size was not greater than 200 nm, while for particles of rifabutin it did not exceed 300 nm. ζ-potential of particles was in the range from -4 to -6 mV. The critical micelle concentration (CCM) of the synthesized polymers was in the micromolar range and was determined by fluorescence spectroscopy using diphenylhexatriene (DFHT). It has been shown that with increasing the length of the hydrophobic aliphatic moiety, CCM of polymers decreases, while increasing the molecular weight of the hydrophilic PVP-moiety formed by larger particles.