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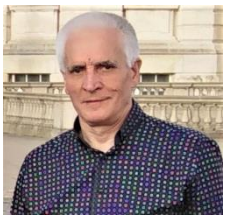
Hydrogel polymer matrices for in-situ synthesis of semiconductor nanoparticles



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Abstract

The specially designed reactive copolymers with pendant peroxide groups (RPC) and poly(ethylene glycols) of various molecular weights (PEG) were used for obtaining the cross-linked reactive polymer matrices useful for in-situ synthesis of semiconductor nanocrystals. The networks in the polymer matrices were formed by annealing the mixtures of RPC and PEG owing to both a sequence of radical reactions and acylation reactions yielding ester linkages between macromolecules of RPC and PEG. The size of NCs and the nanocomposite optical properties depended on several factors, among which the most important were the nature of RPC, MW of PEG, PEG/RPC ratio, concentration of precursor (metal salts). The notable benefit of the method developed is feasibility of obtaining the nanocomposites with a high concentration of NCs (up to 20 wt% and more). It is very important that, in spite of high NC concentrations, the nanocomposites were transparent, not opaque evidently because of formation of NCs inside of the swelled polymer gel matrix that avoids their aggregation.

Biography:

Victor Tokarev is a Professor at Lviv Polytechnic National University, Lviv, Ukraine. He completed his MS in Chem. Engineering at Lviv Polytechnic National University, Lviv, Ukraine; Later he finished his PhD from Macromolecular Science, Institute of Polymer Chemistry, National Academy of Sciences, Kyiv, Ukraine; He received many fellowships and grants to work at different universities like Clarkson University, Potsdam, NY, USA; Taiwan Textile Research Institute, Taipei, Taiwan; Institute for Polymer Research, Dresden, Germany; Royal Institute of Technology, Stockholm, Sweden. He has published more than 40 papers in reputed journals and earned more than 50 patents.

Speaker Publications:

1. "Effect of Silica Surface on Thermal Decomposition of the Immobilized Peroxide Oligomers"; Chemistry and Chemical Technology / Vol 14, 2020, 205-213.
2. "Synthesis and properties of Silica nanoparticles with functional polymer shell"; Chemistry, Technology and Application of Substances / Vol 02, issue 01, 2019.
3. "The effect of surface modification of particulate KCl filler on rheological behaviour of its paste-like composites"; Journal of Chemistry and Technologies / Vol 26, 2018, 20-30.
4. "Thin polymer films grafted to the solid surface with in situ synthesized CdS nanocrystals"; Journal of Polymer Research / Vol 22, 2015.
5. "Flame-Retard Polymer Composites on the Basis of Modified Magnesium Hydroxide"; Chemistry and Chemical Technology/ Vol 09, 2015.

6th Edition of International Conference on Polymer Science and Technology; Webinar – April 01-02, 2020.

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