

Synthesis of the hydrosols of oxygen-containing neodymium compounds for medical application

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Abstract

At the present time application of different nanodispersions in chemical technology is becoming more and more popular. Such systems, because of small particle size, have specific physico-chemical properties. Hydrosols, including hydrosols based on rare-earth elements, are one of the examples of such systems.

Materials based on rare-earth elements and obtained using sol-gel method are promising in many fields of chemical technology. However, there are a small number of literature sources, where synthesis and properties of such hydrosols are described.

For this reason the goal of this study was a development of synthetic method of oxygen-containing neodymium compounds hydrosols and research of their main colloid-chemical characteristics.

Synthetic method of the stable hydrosol from neodymium nitrate hexahydrate was developed. The dispersed phase concentration in the hydrosol was determined using photometric titration. Appraisal of dispersed phase particle size was carried out using TEM. It is determined that the hydrosol's particles have anisometric shape, which is rod like. Aggregative stability pH band of the hydrosol was determined using turbidimetry. It is determined that at pH lower than 4.5 particles fully dissolve, and at pH higher than 10.0 coagulation and aggregation of particles occurs and system is becoming aggregative unstable.

Obtained experimental data can be useful in case of further research and implementation in technology of recycle and use of neodymium, and also hydrosols based on it can be promising material for obtaining of neodymium laser applied in surgery.

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