OR-4. MODIFYING THE SURFACE OF CERIUM OXIDE NANOPOWDERS PRODUCED BY PHYSICAL METHOD

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Cerium oxide nanoparticles present an interesting material for different industrial applications in biotechnology and medicine. The CeO₂ nanopowder was produced by the method of pulsed electron evaporation of ceramic oxide targets with condensation of the vapors in a low pressure gas [1]. The modification of nanoparticle surface was made with sodium citrate and N-phosphonomethylaminodiacetic acid [2]. The stable aqueous suspensions of CeO₂ nanoparticles could not be obtained in the work. This is probably due to the high hydrophobic properties of the nanoparticle surface.

Dimensions of agglomerates in CeO₂ nanoparticles suspension modified with sodium citrate

CeO ₂ / Sodium citrate, mg/ml	The average size of the agglomerates of the suspension, nm	Comments
1/1	150 ÷ 200, 600	Evidently two distribution peaks
0,5/0,5	150 ÷ 200, 600	Two distribution peaks are clearly expressed
0,5/0,25	50 ÷ 1000	Uniform distribution of all sizes
0,5/0,5 + DMEM	200	One peak distribution

The present paper dealt with cerium oxide nanoparticles obtained by a pulsed electron beam evaporation in the low-pressure gas. The result of work was the surface modifications of CeO₂ nanoparticles with sodium citrate and PMIDA. The use of sodium citrate in ratio of 1 : 1 leads to more stable aqueous colloid. However, the sedimentation rate for this solution is rather high and nanoparticles precipitate during several days. We could not obtain stable nanodispersed colloidal solutions of CeO₂ nanoparticles with PMIDA modification as well. The high hydrophobic properties of the CeO₂ nanoparticles surface is probably responsible for this result.

References

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