Interaction of chelated alkoxyalumoxanes with acetylacetonates of yttrium and magnesium

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Abstract

Chelated alkoxyalumoxanes readily interact with acetylacetonates of yttrium and magnesium in various combinations and ratios. The reaction results in organomagnesium oxane yttrium oxide alumoxane oligomers with homogeneous distribution of metals in oligomer matrix at the molecular level. Chelated alkoxyalumoxanes interaction with the hydrate of yttrium acetylacetonate and with magnesium acetylacetonate may be presented by the following scheme: $[Al(OR)_s(OR^*)_x(OH)_pO_q]_m+a(R^{**}O)_3Y•2,5H_2O+k(R^{**}O)_2Mg→(s-l)ROH++[(R^{**}O)MgO]_k•[Al(OR)_l(R^{**}O)_g(OR^*)_x(OH)_zO_y]_m•[(R^{**}O)_hY(OH)_tO_r]_a$(I), where a, k=0.1-6 m=3-12; s+x+2q+p=3; k/m+l+g+x+2y+z=3; h+2r+t=3; R– C_nH_{2n+1}, n=2,4; R*– $C(CH_3)=CHC(O)OC_2H_5$; R**–$C(CH_3)=CHC(O)CH_3$. The reaction proceeds at 50-70ºC in ethyl alcohol, breakdown of alumoxanes bonds is not observed therewith. First of all, the reaction proceeds with the hydroxyl groups, and then with the alkoxy groups at Al to form Y–O–Al and Mg–O–Al bonds. Hydrolytically stable in air, soluble in organic solvents organomagnesium oxane yttrium oxane alumoxanes, depending on a, k, m values in compound (I), are viscous liquids or hard brittle substances from light yellow to reddish brown, reacting with acids and alkalies. Their composition and structural features have been studied by advanced physicochemical methods (^1H, ^{13}C, ^{27}Al NMR, IR, SEM, and TGA).

Biography

Galina Shcherbakova has completed her Phd in Chemistry, and currently she is a Leading Researcher of the State Research Institute for Chemistry and Technology of Organoelement Compounds (SSC RF “GNIIChTEOS”). Her scientific interests include synthesis, structure and reactivity of organoelement and organometallic compounds; fundamentals of new materials creation; nanoparticles, nanomaterials; development of new structural materials and coatings. She has published more than 30 papers in peer-reviewed journals.

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