CERIUM FLUORIDES: INFLUENCE ON BORON OXIDATION AND NEW METHOD OF SYNTHESIS

A. A. Rogozina[1], G. P. Kuznetsov[2], D. S. Shmelev[1], I. A. Zhidkova[3], I. V. Kushnarenko[2,4], I. G. Assovskiy[2,5], L. Y. Kashporov[6], and M. N. Brekhovskikh[3]

[1]FSUE "Federal Center for Dual Technologies "Soyuz," 42 Acad. Zhukova Str., Dzerzhinsky, Moscow Region 140090, Russian Federation
[2]N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation
[3]Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences, 31 Leninskiy Av., Moscow 119991, Russian Federation
[4]Joint-Stock Company "Krasnoarmeiskii Scientific Research Institute of Mechanization," 8 Ispyitateley Av., Krasnoarmeysk, Moscow region 141292, Russian Federation
[5]National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), 31 Kashirskoe Shosse, Moscow 115409, Russian Federation
[6]Joint-Stock Company "Federal Research-and-Production Centre "Scientific Research Institute of Applied Chemistry," 3 Acad. Silin Str., Sergiev-Posad, Moscow Region 141313, Russian Federation

Abstract: The aim of this work is increasing the efficiency of oxidation of amorphous boron in air. The influence of cerium fluorides on suppression of the reduction reaction of boron has been studied. Thermodynamic analysis and experimental investigations (differential scanning calorimetry, thermogravimetric analysis, and thermometry by microthermocouples) of interaction between the cerium fluoride mixtures with boron and boron oxide have been carried out. The results of the research prove the possibility of decreasing the temperature of boron active oxidation in the presence of CeF_3 or CeF_4, which is more preferable. The lower thermal stability of CeF_4 compared to CeF_3 has been found. An original method of synthesis of CeF_4 using XeF_2 fluorination has been proposed.

Keywords: cerium fluorides CeF_n; cerium trifluoride CeF_3; cerium tetrafluoride CeF_4; amorphous boron; boron oxide B_2O_3; xenon difluoride XeF_2; boron oxidation; thermal stability of cerium fluorides; thermodynamic (TD) calculations; differential scanning calorimetry (DSC); termogravimetric analysis (TGA); exothermic effect; endothermic effect; CeF_4 synthesis; XRD analysis; analysis of experimental results

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Contributors

Rogozina Anna A. (b. 1991) — engineer, FSUE "Federal Center for Dual Technologies "Soyuz," 42 Acad. Zhukova Str., Dzerzhinsky, Moscow Region 140090, Russian Federation; npi-2013@bk.ru

Kuznetsov Gennadiy P. (b. 1947) — Candidate of Science in physics and mathematics, professor assistant, senior research scientist, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; kuznetsov-47@bk.ru

Shmelev Daniil S. (b. 1991) — head of group, FSUE "Federal Center for Dual Technologies "Soyuz," 42 Acad. Zhukova Str., Dzerzhinsky, Moscow Region 140090, Russian Federation; kapman8@gmail.com

Zhidkova Inga A. (b. 1990) — leading technologist, Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences, 31 Leninskiy Av., Moscow 119991, Russian Federation; 3340651@mail.ru

Kushnarenko Igor V. (b. 1978) — PhD student, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; research scientist, Joint Stock Company "Scientific-Research Institute of Mechanization of Krasnoarmeysk," 8 Ispyitateley Av., Krasnoarmeysk, Moscow Region 141292, Russian Federation; ivk_chph.ras@mail.ru

Assovskiy Igor G. (b. 1946) — Doctor of Science in physics and mathematics, professor, head of laboratory, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; professor, National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), 31 Kashirskoe Sh., Moscow 115409, Russian Federation; assov@chph.ras.ru

Kashporov Leonid Ya. (b. 1934) — Candidate of Science in technology, associate professor, leading research scientist, Joint-Stock Company "Federal Research-and-Production Center "Scientific Research Institute of Applied Chemistry," 3 Acad. Silin Str., Sergiev-Posad, Moscow Region 141313, Russian Federation; d78d@mail.ru

Brekhovskikh Maria N. (b. 1956) — Doctor of Science in chemistry, professor, head of laboratory, Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences, 31 Leninskiy Av., Moscow 119991, Russian Federation; mbrekh@igic.ras.ru