The preparation and investigation of properties of Er_2O_3

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Erbium nanooxide has been obtained two methods.

I- method Erbium nanooxide preparation method with chlorides: the corresponding metal amount was dissolved in hydrochloric acid and chloride was obtained. Distilled water +NaOH+NaCl was added to obtained chloride. It was heated at pH=3.6-3.8 and evaporated. Hydrate $ErCl_3$ + NaCl was prepared. This mixture was roasted at 440°C, washed and filtered using Bruchner filter, the sediment was dried. The second sample was roasted at 540°C, the third one at 640°C. Roasting time for all samples was similar- 1hour.

X-ray phase analysis shown that in the process of roasting the reflex intensity is growing corresponding to cubic Er_2O_3 structure. Size value of coherent-scattering region calculated using the Sherrer formula for the sample roasted at 440 C, is approximately 31 nm. For the sample roasted at 540 C, this value is 62 nm. For sample roasted at 640 C, this value is 65 nm. Thus, OKP size for all the studied samples is growing when roasting temperature is increasing but for all studied temperatures it remains in nanometric range.It can be noted that in diffraction patterns 1, there are also peaks that couldn't be identified yet apart from the peaks related to cubic of erbium oxide lattice. In diffraction patterns 2, all the peaks are related to Er_2O_3, crystallized in cubic lattice.

2- method of preparation of Er_2O_3 with use organic compounds, which consisted of several steps:

1step: Synthesis of sodium oleinate.
2step: Synthesis of erbium chloride.
3step: Synthesis of erbium olenate.
4step: Er_2O_3 nanocrystal preparation.
X-ray phase analysis has shown single phase nanooxide have been obtained with 24nm size.
Magnetic, thermic, chemical properties have been investigated.

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