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Selecting of the Diffuse Reflectance Spectra Parameters for Identification of Oxygen Containing Admixtures and the Degree of Interaction in ZnS(ZnO)–Dy_2S_3 Systems

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Possibility of identification of Dysprosium(III) compounds – oxosulfide (Dy_2O_2S), sulfide (Dy_2S_3) and oxide (Dy_2O_3) under characteristics of spectra of diffuse reflectance (position, intensity and splitting of the bands caused by 4f-4f-electronic transitions in Dy^{3+} ion) in near IR-interval of a spectrum. Quantitative parameter $F(R)_{max}/F(R)_{IV}$ - the relation between intensities of the bands of reflectance corresponding to transitions $^6H_{13/2} \rightarrow {}^6H_{9/2}, {}^6F_{11/2}$ and $^6H_{13/2} \rightarrow {}^6H_{11/2}$ – is proposed making possible detecting presence of Dysprosium oxosulfide in samples of Zinc sulfide alloyed with Dy_2S_3 which is used as sulfidizing and oxygen-removing additive. It is established that the negative deviation from additivity of values of F(R) of the bands of diffuse reflectance with increase of the content of Dysprosium sulfide in samples of ZnS-n%Dy_2S_3 can serve as the interaction characteristic of admixture (ZnO) and alloying (Dy_2S_3) components in studied systems.

Keywords: zinc sulfide, dysprosium sulfide, dysprosium oxosulfide identification, diffuse reflectance spectra parameters