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9. – 12. travnja 2019. • Šibenik, Amadria Park (Solaris)

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April 9–12, 2019 • Šibenik, Amadria Park (Solaris), Croatia

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Alumina production from purified Bayer liquor
Proizvodnja glinice iz pročišćene Bayerove otopine

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Removal of some impurities from Bayer liquor, such as zinc compounds, allows obtaining alumina with low content of impurities incorporated in the crystalline structure. Impurities in alumina influence the quality of products obtained from alumina during electrolysis. In this research, the purification method presented in our previous paper was used for the purification of Bayer liquor, from which alumina was produced [1]. Crystallization of Bayer liquor was conducted at 52 °C during 24 h, whereas aluminum hydroxide with specific structural properties was used as the seed. The crystallization product (aluminum hydroxide) was calcined at 950 °C for 2 h with the heating rate of 5 °C min^{-1}. The obtained alumina (Alumina I) is compared with alumina obtained without Bayer liquor purification (alumina from bauxite refinery „Alumina" l.t.d., Zvornik, B&H – Alumina II). Zinc content is determined by atomic absorption spectroscopy. Structural and morphological properties are characterized by XRD, FT-IR, N_2-physisorption, and particle size analyzer. Zinc content as ZnO in the initial and purified Bayer liquor was 0.0494 g dm^{-3} and 0.0057 g dm^{-3}, respectively. Alumina from bauxite refinery contains 0.0260% ZnO, whereas the zinc content in alumina obtained after Bayer liquor purification was 0.016% ZnO. XRD analysis (Figure 1) showed that crystal structure is not destroyed and characteristic lines for both samples are at a 2θ angle: 34.2, 37.2, 40.7, and 49.8. Bands characteristic for γ-Al_2O_3 and α-Al_2O_3 in pseudoboehmite structure can be observed at low wavenumbers in the obtained FT-IR spectra [2]. Specific surface area and average pore diameter are shown in Table 1. These values are similar for both alumina samples.

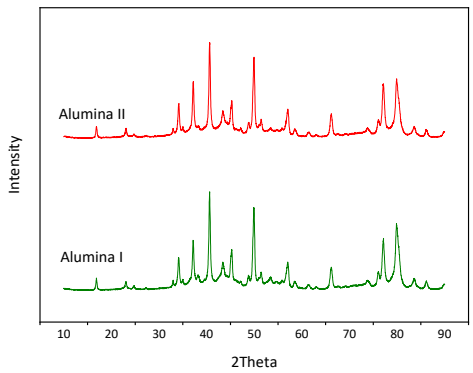

Figure 1: XRD pattern of the produced alumina.

Table 1. Structural properties of alumina

Sample	S_{BET} (m^2/g)	D_{av} (μm)
Alumina I	47.5	4.00
Alumina II	53.8	1.62

References

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