

## 2D AND 3D MODELS OF ALUMINIA ELECTROLYSIS IN REDUCTION CELLS

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Various mathematical approaches used in modeling of industrial reduction cells are discussed in this article. A mathematical model based on the hypothesis of unmixing fluids (aluminum and electrolyte) interacting by viscous friction is compared to model based on homogenous multiphase approach. Gas phase can be introduced as the third component of multicomponent flow in order to achieve better results. 2D model argumentation based on low vertical velocity component is introduced. Results of calculations provided by these models are compared. Large time-scaled calculations are performed well by two-phase model and modeling of electrolysis in details was made using 2D model that can perform calculations in real time.

### Литература.

1. *Alatortcev A.V., Kuzmin R.N., Provorova O.G., Savenkova N.P.* Dynamic model of magneto-hydrodynamic processes in reduction cell  
// *Prikladnaya Phisika*, Issue 5, Year 2004, Page 33-42
2. *Alatortcev A.V., Kuzmin R.N., Provorova O.G., Savenkova N.P.* Dynamic model of magneto-hydrodynamic processes in reduction cell  
// *Труды факультета ВмиК МГУ имени Ломоносова*, Номер 15, Год 2003, Стр. 46-61