Research on Ultrafine Particles Classification Using Hydrocyclone with Annular Rinse Water

Authors : Tao Youjun, Zhao Younan

Abstract : The separation effect of fine coal can be improved by the process of pre-desliming. It was significantly enhanced when the fine coal was processed using Falcon concentrator with the removal of -45um coal slime. Ultrafine classification tests using Krebs classification cyclone with annular rinse water showed that increasing feeding pressure can effectively avoid the phenomena of heavy particles passing into overflow and light particles slipping into underflow. The increase of rinse water pressure could reduce the content of fine-grained particles while increasing the classification size. The increase in feeding concentration had a negative effect on the efficiency of classification, meanwhile increased the classification size due to the enhanced hindered settling caused by high underflow concentration. As a result of optimization experiments with response indicator of classification efficiency which based on orthogonal design using Design-Expert software indicated that the optimal classification efficiency reached 91.32% with the feeding pressure of 0.03MPa, the rinse water pressure of 0.02MPa and the feeding concentration of 12.5%. Meanwhile, the classification size was 49.99 μm which had a good agreement with the predicted value.

Keywords : hydrocyclone, ultrafine classification, slime, classification efficiency, classification size

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