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Establishment and joint utilization of static and dynamic models for Baosteel electric arc furnaces

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Establishing mathematical models to predict the production status and process parameters of electric arc furnaces (EAFs) for guiding actual production holds significant importance. Based on the principles of mass and energy balance, this study developed a steelmaking model for ECS EAF. Through calculations with this model, parameters such as post-combustion energy utilization efficiency, oxygen utilization rate, and air inhalation ratio were obtained. These parameters were further incorporated into a dynamic model, which is established based on energy utilization efficiency and metallurgical reaction principles. A targeted comparative analysis was conducted to examine the effects of different processes on various steelmaking indicators of the EAF and to identify optimization directions. In the future, to optimize the steelmaking indicators of the EAF, it is necessary to further enhance the coordination of the oxygen-carbon injection, power supply, scrap feeding rate and strengthen post-combustion in the foamy slag.

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