World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:18, No:02, 2024

Optimal Formation of Metallic Nuggets during the Reduction of Coal-Composite Briquette

Authors : Chol Min Yu, Sok Chol Ri

Abstract : The optimization of formation and growth of metallic nuggets during self-reduction of coal composite briquette (CCB here) is essential to increase the yield of valuable metals. The formation of metallic nuggets was investigated theoretically and experimentally during the reduction of coal composite briquette made from stainless steel dust and coal. The formation of metallic nuggets is influenced by slag viscosity and interfacial tension between the liquid metal and the slag in the reduced product. Surface tensions of liquid metal and slag are rather strong, respectively, due to the high basicity of its slag. Strong surface tensions of them lead to increase of interfacial tension between the liquid metal and the slag to be favorable to the growth of metallic nuggets. The viscosity of slag and interfacial tension between the liquid metal and the slag depends on the temperature and composition of the slag. The formation and the growth of metallic nuggets depend on carbon to oxygen ratio FC/O and temperature.

Keywords : stainless steel dust, coal-composite briquette, temperature, high basicity, interfacial tension
Conference Title : ICCEMT 2024 : International Conference on Chemical Engineering and Materials Technologies
Conference Location : Barcelona, Spain
Conference Dates : February 05-06, 2024