Effect of cooling rate on the microstructure and the hardenability of the grinding balls

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Publication date
2014/1/1

Journal
METALLURGICAL RESEARCH & TECHNOLOGY

Volume
111

Issue
2

Pages
107-117

Publisher
EDP SCIENCES SA

Description
Grinding balls or crushing mills are elements used in cement industry. They require a high wear resistance under the action of abrasive products in the transformation of rock into fine particles smaller than a millimeter. Heat treatments are an essential step for the elaboration of the balls. They allow to obtaining high hardness and wear resistance. The structural and microstructural analysis by X-ray diffraction and scanning electron microscopy permit to understanding their correlations. For this purpose, we studied the influence of certain factors in these treatments. The factors considered in this work are: the austenitizing temperature (950 degrees C and 1050 degrees C), the severity of quenching medium (air cooling ventilation and oil) and the diameter of the ball (ball diameter 50 and 70 mm). The results revealed the presence of carbides type Cr7C3 distributed in a martensitic or ferritic matrix and the rate of …