

Passivation and Depassivation of HPB335 Carbon Steel in Simulated Concrete Pore Solution

Haodong Ji¹, Ye Tian^{1,*}, Ruoyi Zhao², Nanguo Jin¹, Xianyu Jin¹, Zushi Tian^{1,3}, Dongming Yan¹, Hailong Ye³

¹ College of Civil Engineering and Architecture, Zhejiang University, Hangzhou 310058, P.R. China;

² Department of Art Design, Zhejiang Gongshang University, Hangzhou 310058, P.R. China;

³ Department of Civil Engineering, The University of Hong Kong, Pokfulam, Hong Kong 999077, P.R. China;

*E-mail: cetianye@zju.edu.cn

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In order to study the corrosion mechanism of carbon steel, the passive film characteristics, critical chloride threshold and depassivation of HPB335 carbon steel in different solutions were studied. This study mainly used Mott–Schottky analysis, open-circuit potential, linear polarization resistance and point defect model (PDM) to study the passive film characteristics and depassivation mechanism of carbon steel. The experimental results show that the passive film quality and aggressive ions threshold of carbon steel in highly alkaline solutions are mainly related to pH. In the characteristics of the passive film, the correlation between the resistance and the chloride threshold is relatively large. In addition, PDM was used to study the depassivation mechanism of carbon steel. This study demonstrates the effectiveness of PDM for passivation and depassivation of carbon steel in highly alkaline solutions.

Keywords: carbon steel, passive film, chloride threshold, depassivation, PDM

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