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Microstructural and mineral phase changes of reinforced concrete caused by high concentration CO2

Tuesday, 31 May 2022 11:30 (15 minutes)

At present, reinforced concrete is the most commonly used building material. Due to possible CO2 reservoir leakage, reinforced concrete may be corroded by high concentration CO2 (> 1 atm CO2 partial pressure). In order to study the effects of corrosion time, CO2 partial pressure and relative humidity (RH) on structural deterioration of reinforced concrete exposed to high concentration CO2, reinforced concrete samples were prepared and corroded by 0.1, 0.5 and 1.0 MPa high purity CO2 under water immersion, dry gas and 70% relative humidity conditions. The mineral phase changes of the samples were characterized by X-ray diffraction (XRD) and energy dispersive X-ray spectroscopy (EDS), and the structural changes of the samples with different corrosion times were characterized by micron computed tomography (μ-CT). The μ-CT images were analyzed by Avizo software, and the images showed that the concrete corroded by CO2 produced calcium carbonate, which was mainly deposited in pores. The reinforcement corroded by CO2 produced iron oxide and iron hydroxide, mainly deposited on the contact interface between reinforcement and concrete. The corrosion products of reinforcement filled the pores around the reinforcement and penetrated into concrete with the development of corrosion time, which caused cracks to generate and expand. The corrosion degree increased with the increase of corrosion time and CO2 pressure, and the corrosion of reinforced concrete samples immersed in water was the most serious.

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Time Block A (09:00-12:00 CET)

Participation

Online

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