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A self-healing cementitious composite with mineral admixtures and built-in carbonate

X.F. Wang, C. Fang, D.W. Li, N.X. Han, F. Xing

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#### ACCEPTED MANUSCRIPT

### A self-healing cementitious composite with mineral admixtures and

#### 2 **built-in carbonate**

- 3 X.F. Wang<sup>a</sup>, C. Fang<sup>a</sup>, D.W. Li<sup>a</sup>, N.X. Han<sup>a</sup>, F. Xing<sup>a,\*</sup>
- <sup>a</sup> Guangdong Key Laboratory of Durability in Coastal Civil Engineering, College of Civil
- 5 Engineering, Shenzhen University, Shenzhen, Guangdong 518060, China

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#### 7 Abstract:

- 8 In this study, experimental investigations were conducted on the self-healing potential of
- 9 concrete. Sulfoaluminate based expansive agents (CSA), crystalline admixture (CA), and
- 10 calcium hydrogen phosphate were used as part of cementitious materials, and porous
- ceramsites served as the carrier for sodium carbonate solution. The quantification of the
- widths/areas of the cracks was performed to examine the feasibility of the approach and
- optimize mix proportions. A gas permeability test was conducted on two preferred mixes to
- investigate the change in the gas permeability of pre-cracked samples. After curing in still
- water for 28 d, the pre-cracked specimens with ceramsites containing sodium carbonate, and
- 16 appropriate dosages of additives exhibited considerable efficiency in surface crack closure and
- 17 healing in gas permeability. The SEM results indicated the deeper formation of healing
- products (CaCO<sub>3</sub>) in the cracks of the suggested mix when compared to that in the control mix.
- 19 A healing mechanism was discussed based on the experimental results.
- 20 **Keywords:** Self-healing; Ceramsite; Sodium carbonate; Crystalline admixture; Expansive
- 21 agent

E-mail address: xingf@szu.edu.cn (F. Xing)

<sup>\*</sup> Corresponding author at: Guangdong Key Laboratory of Durability in Coastal Civil Engineering, Shenzhen University, 3688 Nanhai Ave, Shenzhen, 518060 Guangdong, P.R. China.

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