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1 **Chemical self-healing system with novel microcapsules for** 2 **corrosion inhibition of rebar in concrete**

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10 **Abstract**

11 Two kinds of chemically-triggered self-healing systems with novel microcapsules are
12 designed to protect rebar from corrosion in concrete. X-ray micro-computed
13 tomography (XCT) method is employed to non-destructively visualize the protection
14 performance and quantitatively evaluate the efficacy of the self-healing system in a
15 wet-dry cyclic accelerating corrosion test. Environmental scanning electron
16 microscopy (ESEM) system equipped with texture element analysis microscopy
17 (TEAM) is used to verify the results of XCT imaging analysis. The results reveal that
18 the self-healing system- high efficiency is achieved by delaying the depassivation of
19 the rebar and reducing the corrosion rate.

20 **Keywords:** chemical self-healing system; microcapsule; X-ray micro-computed
21 tomography (XCT); depassivation; corrosion rate
22

23 **1. Introduction**

24 Reinforced concrete is recognized as an outstanding artificial construction

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