

Review of Bacteria-Based Self-Healing Concrete

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Abstract: Concrete is one of the most widely used construction materials and has a high tendency to form cracks. These cracks lead to significant reduction in concrete service life and high replacement costs. Although it is not possible to prevent crack formation, various types of techniques are in place to heal the cracks. It has been shown that some of the current concrete treatment methods such as the application of chemicals and polymers are a source of health and environmental risks, and more importantly, they are effective only in the short term. Thus, treatment methods that are environmentally friendly and long-lasting are in high demand. A microbial self-healing approach is distinguished by its potential for long-lasting, rapid and active crack repair, while also being environmentally friendly. Furthermore, the microbial self-healing approach prevails the other treatment techniques due to the efficient bonding capacity and compatibility with concrete compositions. This study provides an overview of the microbial approaches to produce calcium carbonate (CaCO₃). Prospective challenges in microbial crack treatment are discussed, and recommendations are also given for areas of future research.

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