عنوان مقاله:

The effect of synthesized Cu۲O on the microbial corrosion inhibition of urban sewer systems

محل انتشار:

فصلنامه سنتز و تفجوشی, دوره 1, شماره 2 (سال: 1400)

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خلاصه مقاله:

The microbial corrosion of reinforced concrete sewers was inhibited by synthesized cuprous oxide (Cu۲O) nanoparticles. The antibacterial characteristics of Cu۲O on Acidithiobacillus thiooxidans were investigated by temporal variation of pH, turbidity, and bacterial counting. Three reinforced concrete samples with different weight percentages of electrodeposited Cu۲O (۰.۰۶ wt%, ۰.۰۵۵ wt%, ۰.۰۵ wt%) were used. The bacterial counting showed that the number of bacteria in samples with ۰.۰۶, ۰.۰۵۵, and ۰.۰۵ wt% of Cu۲O was ۴.۸۲, ۴.۴۲, and ۲.۹۴ times lower than the blank sample (BS), respectively. After the bacterial growth, the optical density measurement showed that the percentage of turbidity enhancement for samples with ۰.۰۶, ۰.۰۵۵, and ۰.۰۵ wt% of Cu۲O were ۱۰۸%, ۱۱۸%, ۱۶۵%, respectively, while it was ۴۱۲% for the BS. Moreover, the pilot stage's pH monitoring revealed that the electrodeposited Cu۲O lowered the concentration of hydronium between ۷ to ۸۱ times compared to the BS. Experiments indicated that slight changes in the amount of electrodeposited Cu۲O lead to significant changes in samples' ability to hinder bacterial growth and microbial-induced corrosion.

کلمات کلیدی:

Microbial corrosion, Acidithiobacillus thiooxidans, Concrete sewers, Synthesized cuprous oxide, Nanoparticles