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Degradation-triggered release from biodegradable metallic surfaces.

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Abstract:
This work is dedicated to the investigation of drug-release control by a direct effect of degradation from biodegradable metallic surfaces. Degradation behaviors characterized by surface morphology, immersion, and electrochemical techniques demonstrated that curcumin-coated zinc (c-Zn) had a higher degradation rate compared to curcumin-coated Fe (c-Fe). High anodic dissolution rate due to the higher degradation rate and widely extended groove-like degradation structure of c-Zn propelled a higher curcumin release. On the other hand, a slower curcumin release rate shown by c-Fe scaffolds is ascribed to its lower anodic dissolution and to its pitting degradation regime with relatively smaller pits. These findings illuminate the remarkable advantage of different degradation behaviors of degradable metallic surfaces in directly controlling the drug release without the need for external electrical stimulus.