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(57) Abstract :

A self-healing polymeric coating apparatus (100) is disclosed for metal surfaces. The system includes a polymer reservoir (101), multi-nozzle applicator (105), surface scanner (110), microencapsulation chamber (108), thermal curing unit (106), and control unit (109). The apparatus applies a smart coating with embedded microcapsules that autonomously heal surface cracks via triggered polymerization. The system ensures uniform, adaptive coating and high durability under industrial conditions.

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