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The Role of Self-Repairing Robots in Reducing Downtime and Environmental Impact

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Abstract: *Self-repairing robots represent something new to the world of robotics, offering an integration of advanced materials science, artificial intelligence, and automation that provides increased operational resilience and sustainability. Robots with self-diagnosis, self-analysis, and self-repairing damage abilities will result in less waste resources, less time wasted, and an enormous saving on environmental impacts. Self-repairing robots are capable of changing the issues like equipment failure and resource waste within industries of manufacturing to space exploration. Here the paper discusses the basic mechanisms, challenges, and applications of self-repairing robotics while drawing attention to their importance in achieving sustainable industrial practices that could assist in addressing to the international ecological and economic landscapes.*

Keywords: Self-repairing robots, artificial intelligence, advanced materials, sustainability, predictive maintenance, circular economy, environmental impact, autonomous systems

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