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Dynamic self-assembly of microscale rotors and swimmers MEGAN DAVIES WYKES, New York University, JEREMIE PALACCI, University of California San Diego, TAKUJI ADACHI, LEIF RISTROPH, YANPENG LIU, XIAO ZHONG, JUN ZHANG, MICHAEL WARD, MICHAEL SHELLEY, New York University — Self-assembly is a process found throughout nature and is often dynamic, requiring fuel to occur. Artificial examples are valuable both as aids to understanding biological systems and for developing manufacturing techniques for micron-scale machines. We will describe the behaviour of micron-scale rods, constructed of three equal length segments of gold, platinum and gold (Au-Pt-Au). When placed in a solution of hydrogen peroxide fuel, these are expected to create an extensile-like flow in the surrounding fluid. These immotile rods self-assemble into structures that exhibit the two fundamental types of motion: rotation and translation, in the form of steadily rotating stacks and T-shaped swimmers. This is a rare example of an artificial system where dynamic and reversible self-assembly results in ordered structures which exhibit emergent motility.

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