



Stuart Rowan

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Stuart J. Rowan is the Barry L. MacLean Professor of Molecular Engineering and Professor of Chemistry at the University of Chicago. He is the Director of the Institute for Materials and Sustainability and has a staff appointment at Argonne National Labs. Stuart was born in Edinburgh, Scotland, and grew up in Troon on Scotland's west coast. He received his B.Sc. (Hons.) (in 1991) and PhD (with D.D. MacNicol in 1995) from the University of Glasgow. He then moved to the Chemistry Department at the University of Cambridge to work with Jeremy K. M. Sanders and continued his postdoctoral studies with Sir J.

Fraser Stoddart at the University of California, Los Angeles in 1998. In 1999, he was appointed as an Assistant Professor in the Department of Macromolecular Science and Engineering at Case Western Reserve University in Cleveland, Ohio. In 2005, he was promoted to Associate Professor with tenure and became a Full Professor in 2008. In 2009, he was named the Kent H. Smith Professor of Engineering. In 2016, he moved to the University of Chicago. He is a NSF CAREER and NSF Special Creativity awardee, received the Morley Medal (ACS) in 2014, the CWRU Distinguished University Award in 2015, and the Herman Mark Scholar Award (ACS) in 2015. He is a Fellow of the Royal Society (FRS), an ACS Fellow, an ACS POLY Fellow, a Fellow of the Royal Society of Chemistry, and is currently the Editor-in-Chief of ACS Macro Letters. His group works on supramolecular polymers, dynamic covalent polymers, self-healing materials, responsive adhesives, colloids, sustainable plastics, nanocellulose, polymers for battery applications, autonomous experimentation, biomaterials, and developing new synthetic methods for the construction of complex polymeric architectures

Abstract: “Dynamic Polymer Networks as a Route to Pluripotent Materials”

The concept of a pluripotent material can be best understood by analogy to stem cells, which possess the remarkable ability to differentiate into various cell types. A “stem plastic”, therefore, is a single source material that has the potential to transform into different classes of plastic materials. If a diverse range of materials can be accessed from a single stem plastic, it presents an intriguing alternative perspective on plastic sustainability. Moreover, a pluripotent plastic could play a pivotal role in resource-constrained regions, such as the sea, space, and battlefields, where operational tasks often necessitate a wide spectrum of distinct material properties for specific applications, but limited access to materials is a significant challenge. Therefore, the concept of pluripotent plastics that can be differentiated into various materials based on the need holds great promise. The question, therefore, is “how can we design pluripotent materials?” We have been exploring dynamic covalent networks combined with tempering or training procedures as one promising avenue for achieving this goal. Our latest results in this area will be discussed.