Kevin Cavicchi Wins 2021 Sparks-Thomas Award

Doctor Kevin Cavicchi of the Department of Polymer Engineering at the University of Akron is the winner of the 2021 Sparks-Thomas Award. The award is sponsored by ExxonMobil, and recognizes and encourages outstanding scientific contributions and innovations in the field of elastomers by younger scientists, technologists and engineers.

Cavicchi has made significant contributions to rubber science and technology and network polymers, specifically with research on polymer organogels, shape memory elastomers, ionomers and block copolymers. At the University of Akron, he developed a creative program of polymer synthesis using RAFT (reversible addition-fragmentation chain transfer) polymerization, and, most notably, he has contributed a number of novel RAFT agents. His research on organogels, which focuses on the thermodynamics of those materials, facilitated the development of new gelator technology with hydrocarbon elastomers.

Another contemporary technology field in which Cavicchi has made noteworthy scientific contribution is shape memory polymers (SMPs). SMPs require two different networks: a permanent network formed from either covalent bonds or physical bonds with extremely long relaxation times, and a temporary network that is reversible as a consequence of a structure change induced by the application of an external stimulus, e.g., temperature. Cavicchi uses a value-added approach for transforming commodity elastomers into shape memory polymers. His research involves judicious blending of inexpensive small molecules into elastomers to develop and tailor shape memory behavior.

In the field of ionomers, Cavicchi took the novel approach of exploiting the supramolecular self-assembly of ion-pairs to develop new thermoplastic elastomers.

Cavicchi has also made a major advancement in the potential use of block copolymers in nanotechnology, achieving large scale unidirectional alignment of the cylindrical domains of an SIS block copolymer using a modification of a solvent vapor annealing process.

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