# Synaptic Mimicry Utilizing *n*-Alkyl Methacrylate Polymers

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**Abstract:** Memory devices based on organic materials are a promising alternative towards the next generation of nonvolatile nanoelectronics. In this effort, a polymer derivative of the electronically active carbazole moiety is synthesized, characterized and tested. Under an applied electric field, the carbazole groups are speculated to rearrange their alignment, thus facilitating easier electron carrier delocalization and charge transport through molecular conformational changes. By tuning the structure of the polymer, the chain flexibility and number of resistive states can be further increased where low carbon chain polymers (such as poly(vinyl carbazole)) are known to shown bistable states compared to long carbon chain polymers that portray enhanced electrical properties. The ability to change resistance according to applied currents makes the memristor a major candidate for emulating synapses in artificial neural networks – offering both high connectivity and high density required for efficient computing. In this research, memristors are shown emulating essential synaptic plasticity and learning behaviors, including short-term plasticity and spike-timing-dependent plasticity.