

Development of shape memory materials actuator for soft robotics applications

Electroactive polymers (EAPs) are polymeric based materials that can undergo large amount of dimensional change and produce significant reaction force when a voltage is applied to them. Among all types of EAPs, shape memory effect (SME) is one of the most promising solutions due to its high response stress/strain that can be produced by the materials. The deformation is governed by the phase changing under different temperature which can be controlled via Joule heating. Currently, one of the major research focuses is on improving the strain and stress of different types of EAP during actuation. Objectives of the proposed project include: (i) design, fabricate, and characterize SMA and SMP materials, (ii) construct and characterize novel composites by combining or embedding SMA into SMP matrix, and (iii) verify the performance in terms of their actuation motion, including maximum displacement, curvature, and force response.