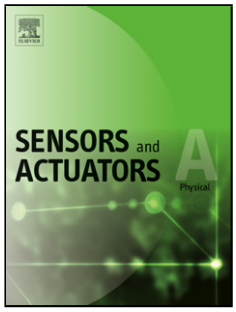

Title: Modeling Framework for Macroscopic Dynamics of Twisted and Coiled Polymer Actuator Driven by Joule Heating Focusing on Energy and Convective Heat Transfer

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- A macroscopic model of twisted and coiled polymer actuator (TCPA) is proposed.
- Temperature and displacement models are derived based on the energy of TCPA.
- Effect of convective heat transfer on the displacement model is clearly explained.
- Results show that the proposed model is more viable than the conventional one.
- In particular, the proposed model reduced the prediction errors of the displacement by more than 50%.