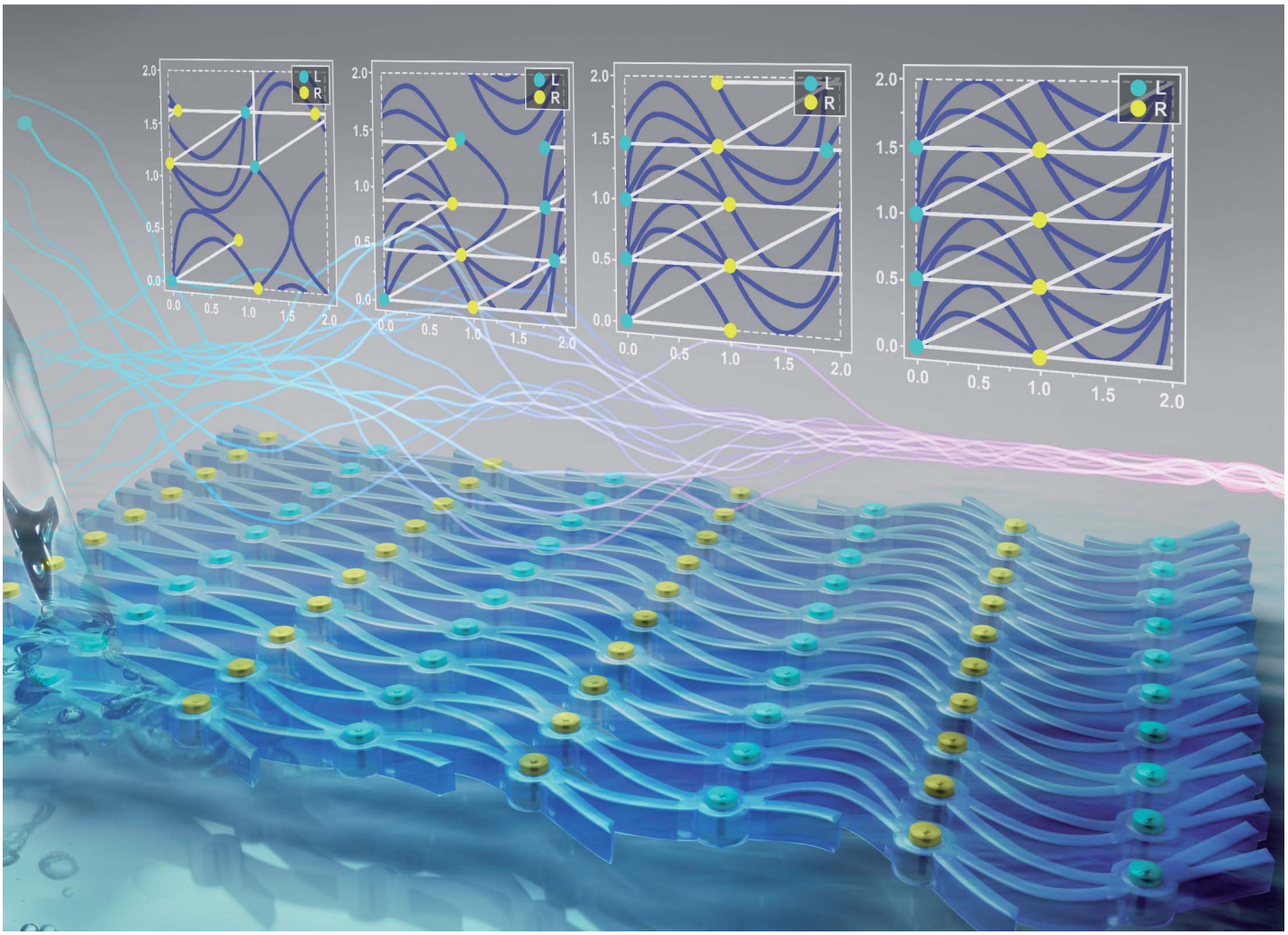
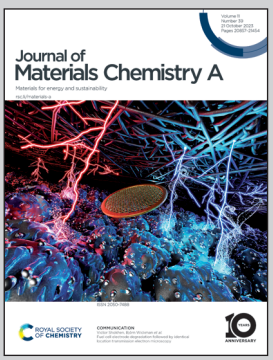


Showcasing research from Professor Castelli's laboratory, Department of Energy Conversion and Storage, Technical University of Denmark, Denmark.

Reinforcement learning-based design of shape-changing metamaterials

We have implemented a reinforcement learning method to rationally design unique metamaterial structures, which change shape during operational conditions. As an example, we have applied this method to design nanostructured silicon anodes for Li-ion batteries (LIB). The newly designed structures have been experimentally validated using a polymer-based 3D printing technique, predicting in threefold and tenfold improvements of the current Si-based LIB anodes and commercial LIB based on a graphitic anode, respectively. This method opens up vast design space for other responsive metamaterials with tailored properties and pre-programmed structural transformation.

As featured in:



See Xiaoxing Xia, Ivano E. Castelli *et al.*, *J. Mater. Chem. A*, 2023, **11**, 21036.

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