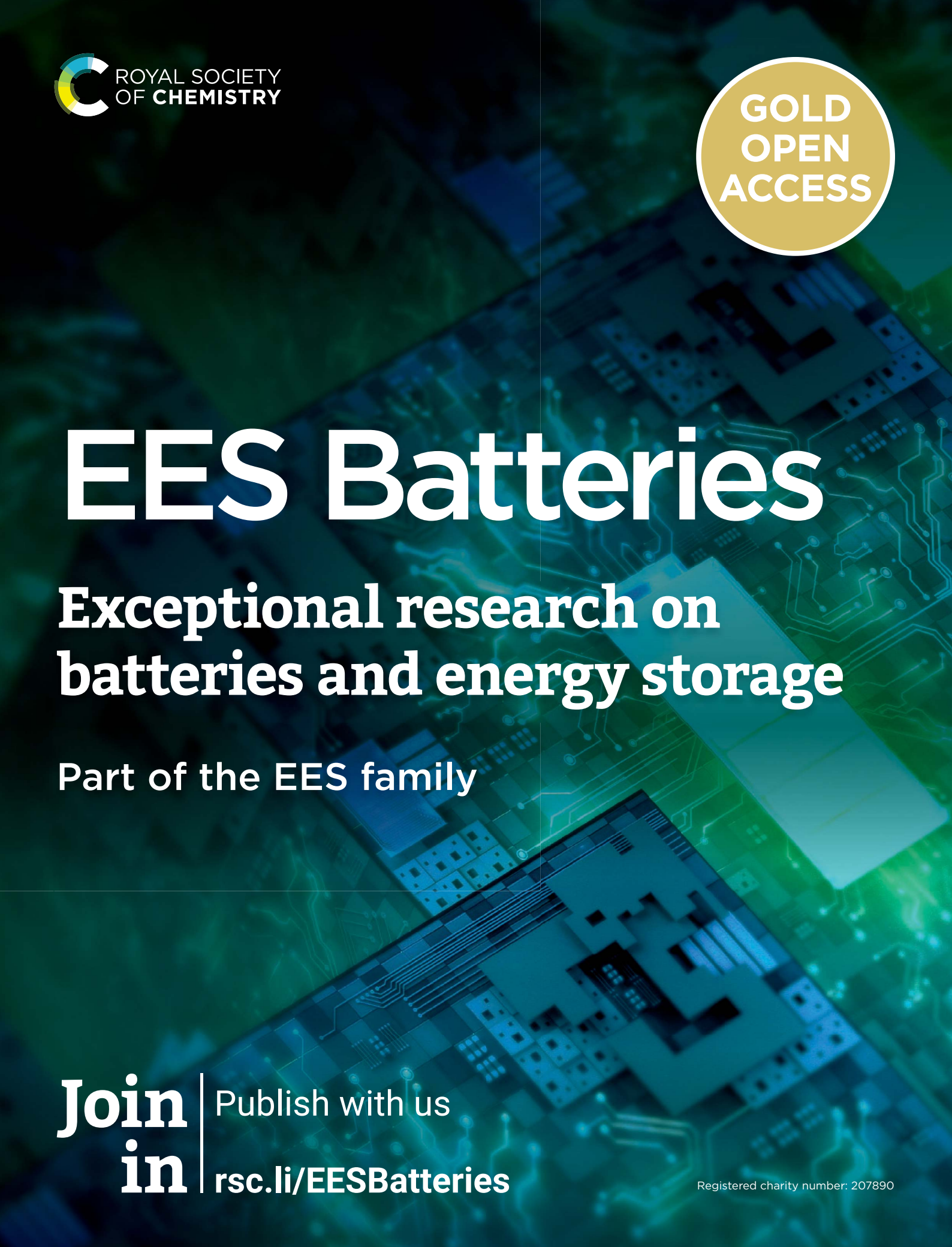
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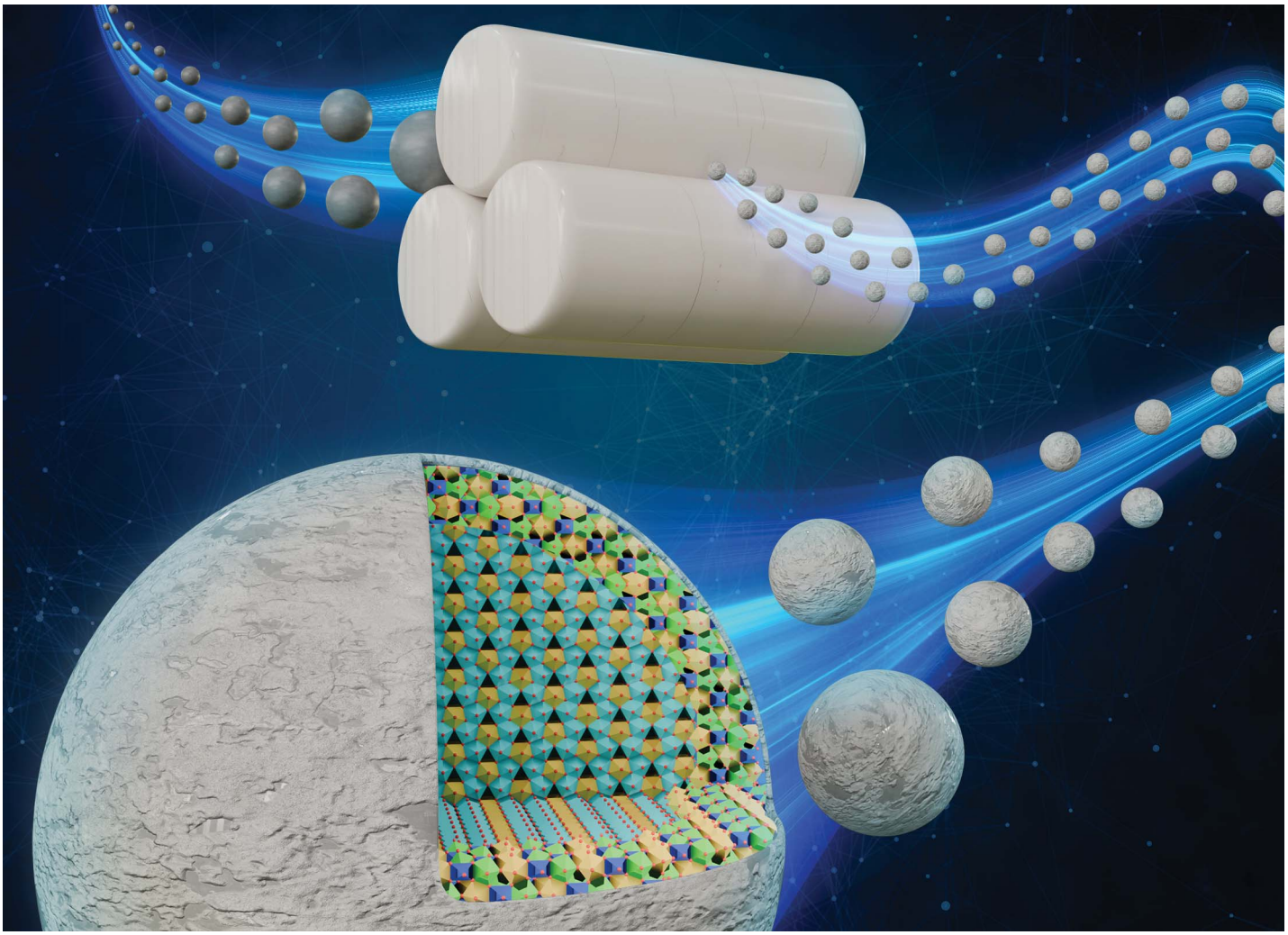

Showcasing research from the Materials and Chemistry Group, Nuclear Nonproliferation Division, Oak Ridge National Laboratory, Tennessee, USA.

Mechanochemical α to β phase transition of U_3O_8

This work examines the kinetics and mechanism of the mechanochemical α- to β-U_3O_8 phase transition, improving our understanding of the thermodynamic relationship between the two polymorphs. Milling of α-U_3O_8 using different milling media shows an ingrowth of the β-phase over time, with observed correlation between media density, percent conversion and lattice strain. Anisotropic peak broadening within collected X-ray diffraction powder patterns suggests preservation of uranium polyhedral layered sheets. Preservation of these sheets implies a shear-induced slip mechanism occurring through in-plane shifting of uranium polyhedra along lattice planes perpendicular to the polyhedral sheets.

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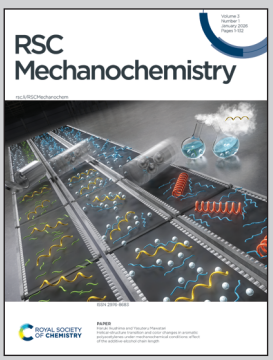

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