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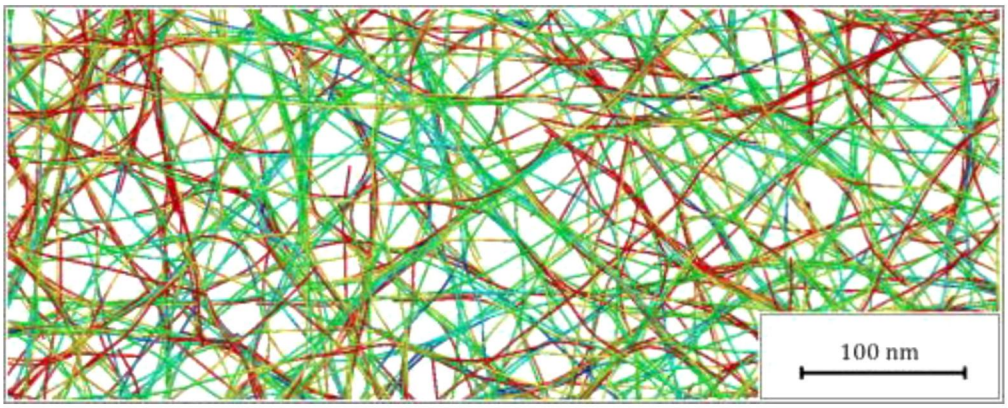
Graphical abstract



Highlights

► We formulate a new micromechanical model of elastic open-cell foams. ► The model includes bubbles to represent broken membranes in a foam. ► We integrate the model in a finite element code and carry out 3D simulations. ► Phase transition is the dominant deformation mechanism at large strains. ► Bubbles play a cardinal role at large deformations.