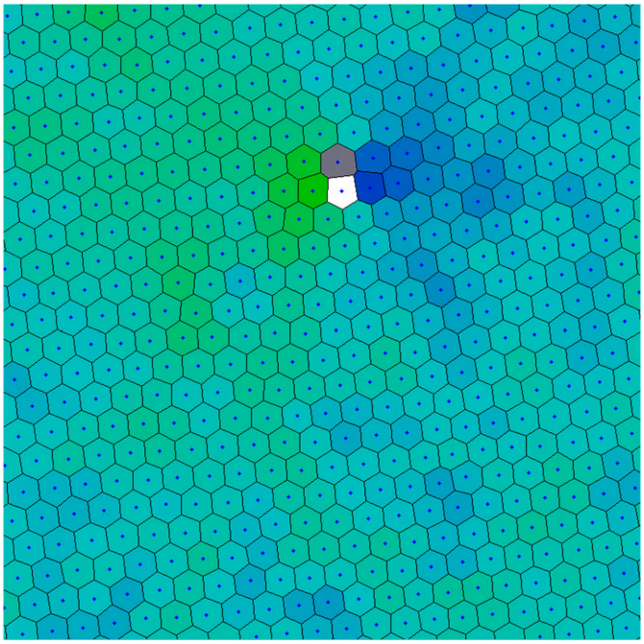
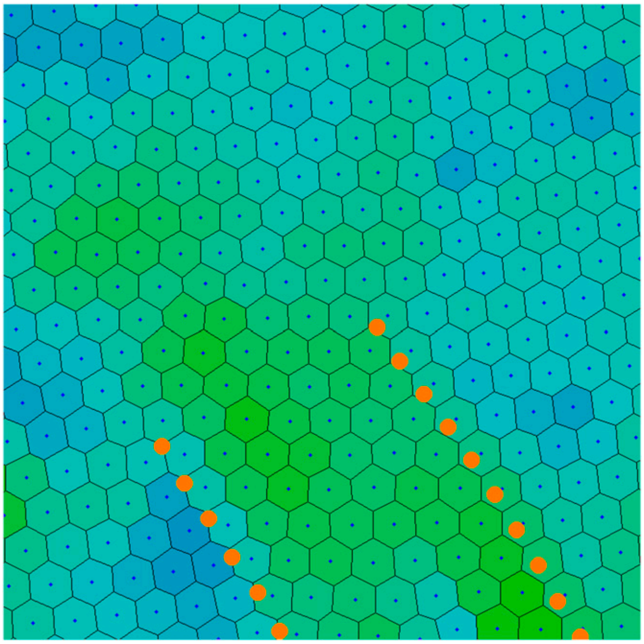
Supporting Information

Irvine et al. 10.1073/pnas.1300787110



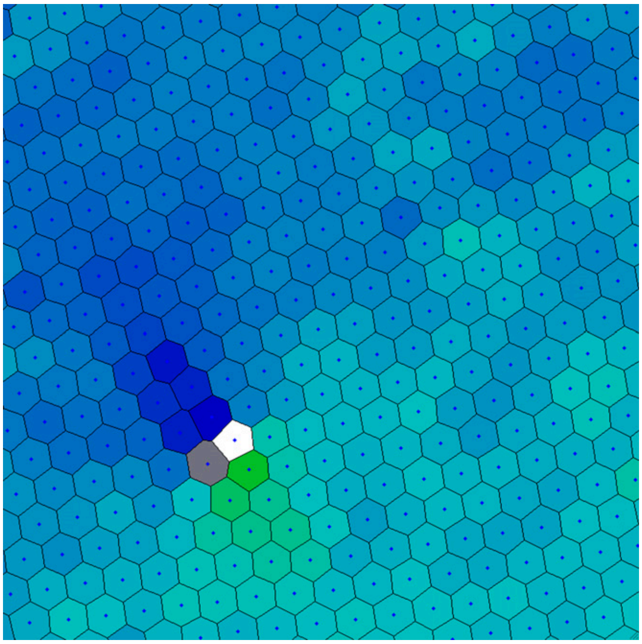
Movie S1. Control of dislocations with topological tweezers. Glide can be induced by shearing the lattice on either side of a dislocation.

Movie S1



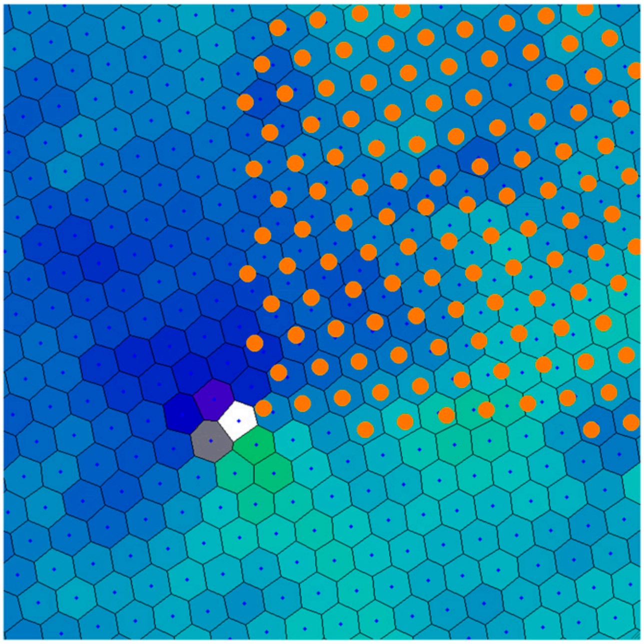
Movie S2. Control of dislocations with topological tweezers. Fissioning of a pair of dislocations by shearing a defect-free region of the lattice beyond the elastic regime.

Movie S2



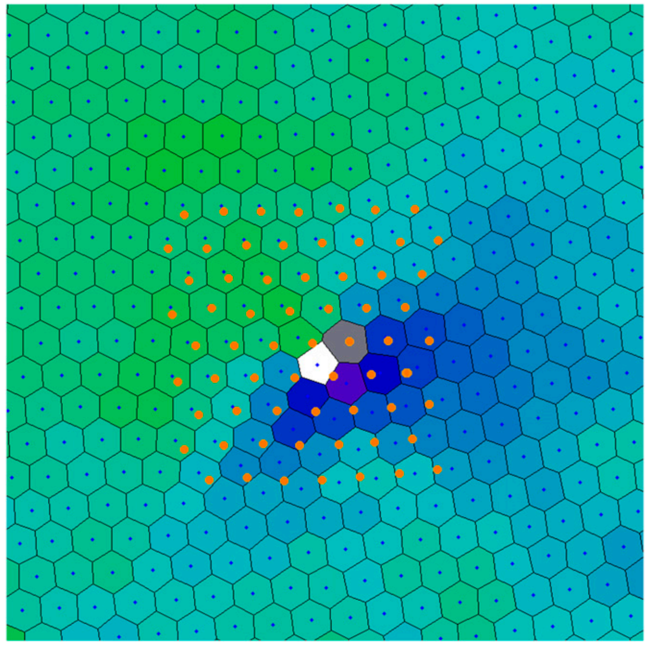
Movie S3. Control of dislocations with topological tweezers. A climb force applied by dilating the lattice on one side of the dislocation results in the fissioning of the dislocation into a pair which by its joint gliding motion moves in the climb direction of the original dislocation.

Movie S3



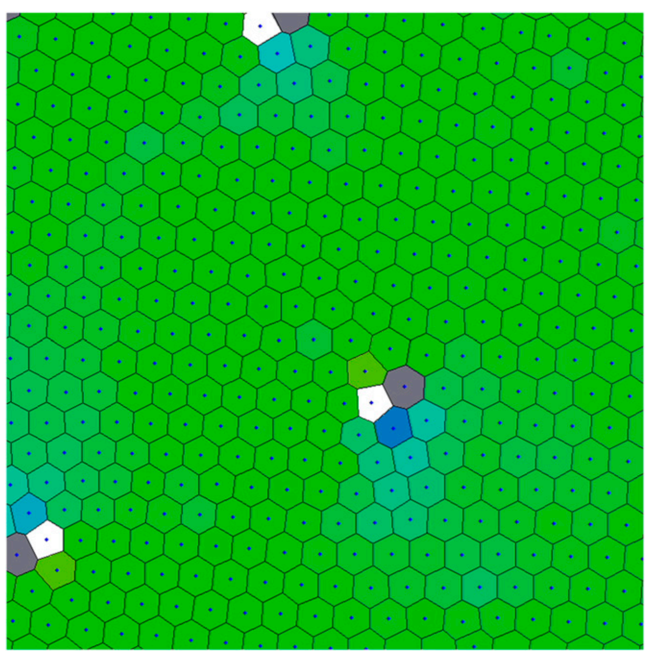
Movie S4. Control of dislocations with topological tweezers. A climb force applied by dilating the lattice on one side of the dislocation results in the fissioning of the dislocation into a pair which by its joint gliding motion moves in the climb direction of the original dislocation.

Movie S4



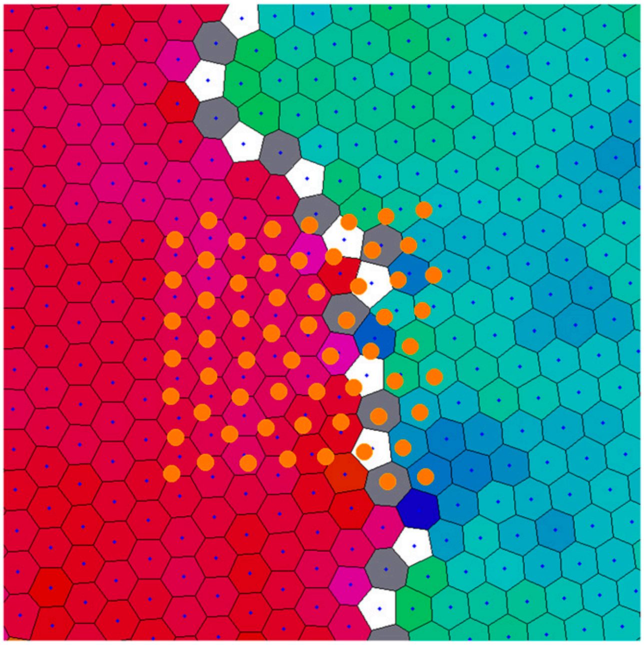
Movie S5. Control of dislocations with topological tweezers. Application of a commensurate set of traps results in the fissioning of a dislocation into a pair.

Movie S5



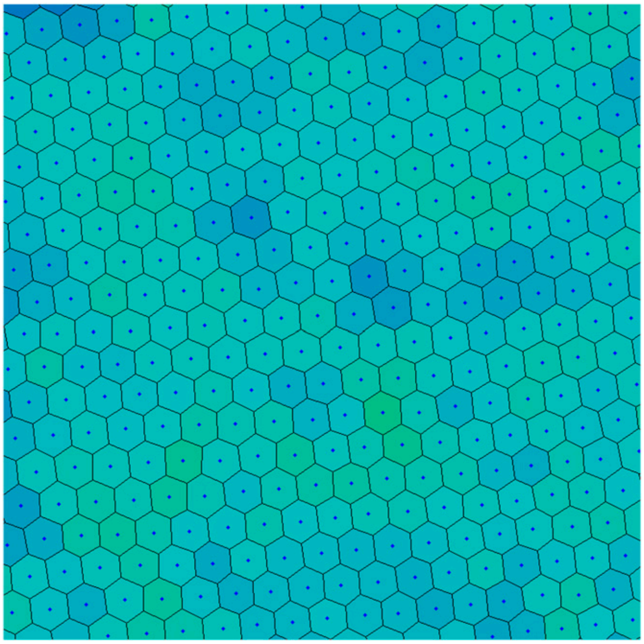
Movie S6. Control of dislocations with topological tweezers. Opposing shear stresses trap a dislocation which can then be moved along its glide plane.

Movie S6



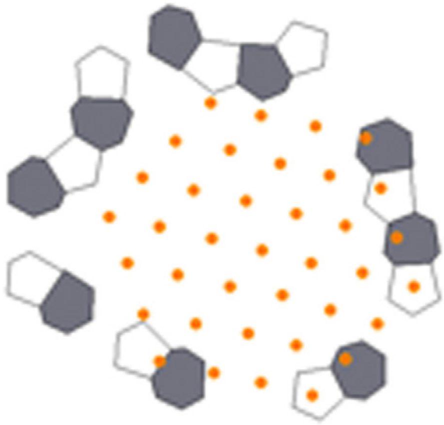
Movie S7. Control of dislocations with topological tweezers. Application of a commensurate potential, aligned with one side of a grain over a grain boundary, is capable of moving the grain boundary.

Movie S7



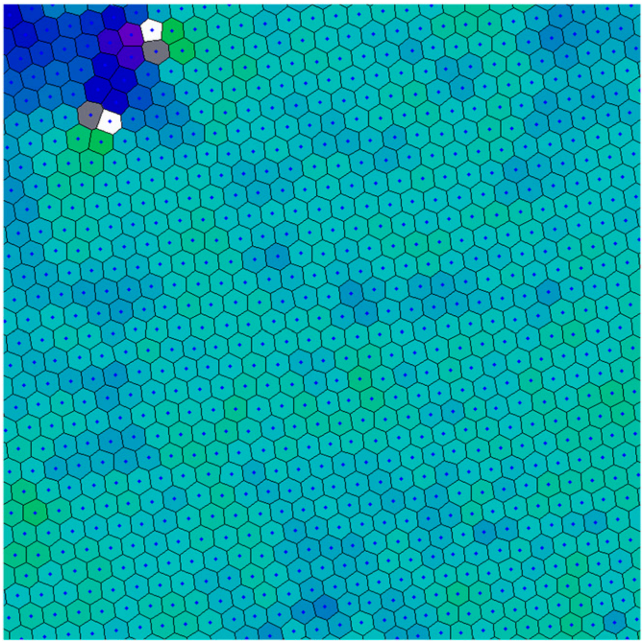
Movie S8. Topological defect dynamics in the formation and rotation of a grain. A commensurate set of traps was rotated counterclockwise from 0° to 60° in 6° steps, giving rise, through a series of cooperative topological defect dynamics, to a grain with boundary.

Movie S8



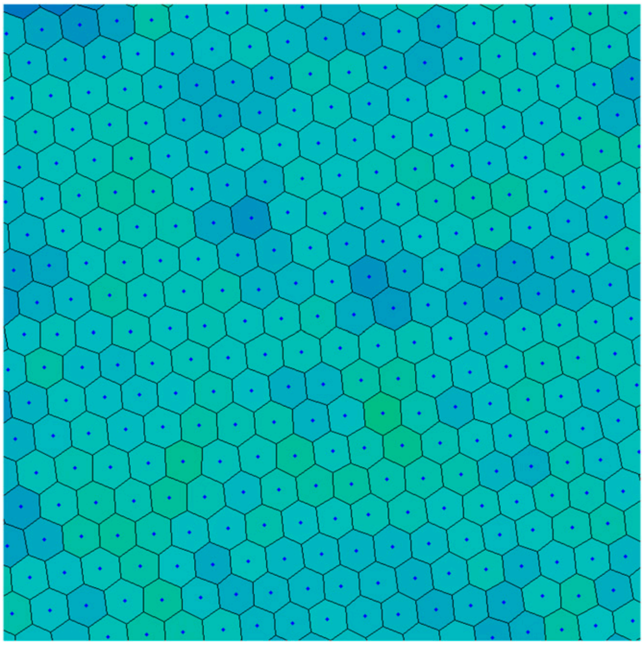
Movie S9. Topological defect dynamics in the formation and rotation of a grain. A commensurate set of traps was rotated counterclockwise from 0° to 60° in 6° steps, giving rise, through a series of cooperative topological defect dynamics, to a grain with boundary. In this rendition, only the topological tweezers and defects are shown.

Movie S9



Movie S10. Topological defect dynamics in the formation, rotation, and destruction of a grain. A commensurate set of traps was rotated counterclockwise from 0° to 60° in 6° steps and then back. The rotation gives rise, through a series of cooperative topological defect dynamics, to a grain with boundary. When the rotation is reversed, the system does not however return to its original state.

Movie S10



Movie S11. Topological defect dynamics in the formation, rotation, and destruction of a grain. A commensurate set of traps was rotated counterclockwise from 0° to 60° in 6° steps and then back. The rotation gives rise, through a series of cooperative topological defect dynamics, to a grain with boundary. When the rotation is reversed, the system does not however return to its original state.

Movie S11