

Description of Additional Supplementary Files

Supplementary Movie 1

Description: This movie shows the volume diffusion behavior of several tungsten atoms inside a copper matrix at 385 °C. This movie corresponds to Figure 1 c in the main text. The movie (like all other movies) has been recorded using high resolution scanning transmission electron microscopy.

Supplementary Movie 2

Description: In this movie the diffusive trajectory of a single tungsten atom in a copper lattice is shown. The atom hops from lattice site to lattice site in a random walk. This movie corresponds to Figure 2 in the main text.

Supplementary Movie 3

Description: This movie shows diffusion at 450 ° C illustrating the acceleration of the atomic motion with elevated temperatures.

Supplementary Movie 4

Description: In this movie the diffusive motion of a single tungsten atom inside aluminum is shown. The atom moves via vacancy mediated jumps from lattice site to lattice site.

Supplementary Movie 5

Description: The diffusive behavior of tungsten atoms in aluminum moving via an interstitial type of mechanism is shown in this movie.

Supplementary Movie 6

Description: This movie shows diffusion along a coherent twin boundary in copper at 350 °C. This movie corresponds to Figure 3 a.

Supplementary Movie 7

Description: In this movie grain boundary diffusion at 250 °C is shown. This movie corresponds to Figure 3 a.