

# Vortex dynamics of two dimensional amorphous W superconductor with Si/W/Si sandwich and W/Si multilayer structure

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## Abstract

The vortex dynamics for superconducting ultra thin amorphous W films are demonstrated in the configuration of single layers with Si/W/Si structure and multilayer composed of a-W and a-Si. We prepared the samples with  $d_W=3\text{nm}$  for single layer and  $d_W/d_{Si}=2\text{nm}/8\text{nm}$  and  $1\text{nm}/5\text{nm}$  for multilayers. Effects of vortex creep phenomena in a wide field range have been investigated by the detailed measurements of R-T and I-V characteristics. For two dimensional single layer, in low field range, the current driven plastic flow phenomenon was observed, while in high fields the macroscopic quantum mechanical tunneling of vortices were suggested prior to the flux flow regime and the scaling analysis showed the result of  $T_g=0$ . For strong anisotropic multilayer, three dimensional melting occurs in weak field range, while in higher fields the crossover to quasi-2D one takes place. Also the glass transition is discussed.