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Time Dependent Effects in Transport Measurements and Absence of Anisotropic Behavior in Polycrystalline MgB₂ MURAT OLU-TAS, ATILLA KILIC, KIVILCIM KILIC, ATILGAN ALTINKOK, HAKAN YETIS, KILIC TEAM — The flux dynamics in polycrystalline sample of MgB₂ have been studied by current-voltage (I-V) measurements for different sweep rates (dI/dt) of transport current at zero magnetic field (H=0) and H≠0, and also magnetovoltage measurements (V-H curves) for different sweep rates (dH/dt). It was observed that the time and hysteresis effects in I-V curves which appear upon cycling of transport current are not significant as compared to those of YBaCuO and BiSrCaCuO. The absence of hysteresis effects in I-V curves were attributed mainly to the absence of weak link structure in MgB₂. The hysteresis effects in V-H curves depend on field orientation of H with respect to I. Furthermore, it was observed that time dependent effects appear in V-H curves as the dH/dt varies and also the counterclockwise behavior which appears in forward region changes its character and becomes clockwise for reverse region. The magnetovoltage measurements were also carried out by varying the angle θ between H and I (V- θ curves). The V- θ curves show that there is no anisotropy in polycrystalline MgB₂. This behavior was discussed in terms of polycrystalline structure of MgB₂ and its band structure where the Fermi surface includes four sheets of one electron-like and three hole-like. The observations were interpreted mainly in terms of flux trapping in grains.

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