The Vortex Dynamics in $Bi_2Sr_2CaCu_2O_8$ Single Crystals of Unirradiated and Low-density Columnar Defect

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We have studied vortex dynamics of $Bi_2Sr_2CaCu_2O_8$ single crystals with unirradiated and irradiated samples by using 100 × 100 μm^2 Hall sensor. Doses of the irradiation are 20G, 100G and 1kG. In the magnetization measurement, second magnetization peak (SMP) was observed in unirradiated sample as contrast with irradiated samples. The SMP was observed in the range of 18K ~ 37K and the amplitude of the SMP decreased exponentially with increasing temperature. In the magnetic relaxation measurement, we show how the activation energy changes with each sample and compare the activation energy of unirradated sample with irradiated samples at each temperature.

keywords : $Bi_2Sr_2CaCu_2O_8$, magnetization, relaxation, second magnetization peak