

Magnetization-Dependent T_c Shift in F/S/F Tilayers and AF/F/S/F Multilayers

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In recent studies of superconductor (S)/ferromagnet (F) hybrids, various phenomena were experimentally found when the magnetization of F-layers is inhomogeneous, or when the magnetization directions in different F-layers are not parallel. We discuss the superconducting transition temperature (T_c) shift with magnetization properties in permalloy (Py) /Nb/Py trilayers and a spin valve structure of FeMn/Py/Nb/Py multilayers. We prepared the samples by using a multi-gun dc magnetron sputtering system and the magnetic easy axis of the Py layers was determined by a residual magnetic field in the growth chamber. We focus on the effects of the magnetic properties of the F-layer on the T_c shift especially when the magnetizations of the F-layers are parallel or antiparallel to each other.

keywords : superconducting transition temperature, Nb, permalloy, spin valve structure