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Spin-Orbital Coupling Effects on Magnetoresistance in Organic Materials YUE WU, ZHIHUA XU, BIN HU, University of Tennessee — We report the studies on magnetoresistance of organic materials based on the light-emitting diode of phosphorescent iridium complex $Ir(ppy)_3$ molecules dispersed in fluorescent poly(N-vinylcarbazole) (PVK). The magnetic field-dependent injection current indicates that the PVK of weak spin-orbital coupling exhibits a significant magnetoresistance while the resistance of $Ir(ppy)_3$ of super-strong spin-orbital coupling shows an independence of magnetic field up to 3000 Gauss. We find that the magnetoresistance from the $Ir(ppy)_3$/PVK composite displays a gradual decrease with increasing the concentration of $Ir(ppy)_3$. The magnetic field-dependent electroluminescence confirms that the dispersed $Ir(ppy)_3$ molecules account for the change of magnetorsistance in the $Ir(ppy)_3$/PVK composite. From the uniform dispersion of $Ir(ppy)_3$ molecules observed from transmission electron microscope, we suggest that the spin-orbital coupling is modified by the interface interaction and consequently varies the magnetoresistance in the $Ir(ppy)_3$/PVK composite.

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