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Photoinduced magnetic and electronic phenomena in organic magnetic semiconductor V(TCNE)$_{x\sim2}$ JUNG-WOO YOO, R. SHIMA EDELSTEIN, A. J. EPSTEIN, The Ohio State University, Columbus, OH 43210, K. I. POKHODNYA, JOEL S. MILLER, Univeristy of Utah, Salt Lake City, UT 84112 — V(TCNE)$_{x\sim2}$ is a fully spin-polarized half- semiconductor, whose magnetic order exceeds room temperature (T_c>350 K), and electronic transport follows hopping mechanism in the Coulomb energy split in π^* band. Substantial decrease of magnetization by illuminating with light (λ=457.9nm) has been found at low temperature (T<100K). The photo-excited metastable state has a lifetime >10^6s at low temperatures and completely relaxes to the state before illumination after annealing upto 250K. Photoinduced ESR analysis indicates strong increase of magnetic anisotropy by light irradiation. We also report substantial increase of conductivity induced by illumination with light (λ=457.9nm). The temperature dependence of resistivity clearly indicates substantial decrease in activation energy for electronic hopping. The photoinduced effect is proposed to originate from structural changes triggered by $\pi \rightarrow \pi^*$ excitation in (TCNE) molecules, which leads modification of the orbital wavefunction resulting in changes of magnetic exchange energy J and the activation energy ΔE. *Supported in part by AFOSR Grant No. F49620-03-1-0175 and DOE Grant No. DE-FG02-01ER45931 and DE-FG02-86ER45271

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