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Organic Magnetoresistance[1]

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In recent years a broad range of magnetoresistance phenomena have been reported for organic-based semiconductors, conductors and magnets. Organic systems illustrating magnetoresistance, include molecular- and polymer-based nonmagnetic semiconductors[1], organic-based spin polarized magnetic semiconductors,[2] nonmagnetic conducting polymers, and ferromagnet/organic semiconductor/ferromagnet heterojunctions. Examples of each of these organic-based systems will be presented together with a discussion of the roles of magnetotransport mechanisms including interconversion of singlets and triplets, compression of the electronic wavefunction in presence of a magnetic field, quantum interference phenomena, effects of a "Coulomb gap" in π^* subbands of organic magnetic semiconductors with resulting near complete spin polarization in conduction and valence bands of magnetic organic semiconductors.[2,3] Opportunities for magnetotransport in Ferromagnet/Organic Semiconductor/Ferromagnet heterojunctions will be discussed.[4]

[1] V.N. Prigodin *et al.*, Synth. Met. **156**, 757 (2006); J.D. Bergeson *et al.*, Phys. Rev. Lett. **100**, 067201 (2008)
[2] V.N. Prigodin *et al.*, Adv. Mater. **14**, 1230 (2002.
[3] J.B. Kortright *et al.*, Phys. Rev. Lett., **100**, 257204 (2008).
[4] J.D. Bergeson, *et al.*, Appl. Phys. Lett. **93**, 172505 (2008).

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