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Magnetically aligned polymer-nanowire composites for solar energy harvesting[1] PAWEL MAJEWSKI, CANDICE PELLIGRA, CHINEDUM OSUJI, Yale University — We present a solution-based approach of producing aligned arrays of ZnO nanowire-polythiophene composites for photovoltaic applications. We employ a two-step hierarchical self-assembly to maximize the efficiency of electron and hole transport in the system. First, we coat the wires with the polymer utilizing nanowire surface-directed crystallization and alignment of the polymer backbones along the long axes of the wires, then we employ magnetic fields to direct the assembly of the composites into the ordered arrays. We present quantitative SAXS data taken in-situ during the alignment process addressing the influence of paramagnetic doping level of ZnO and the magnetic field strength on the quality of the alignment. We compare the electrical conductivity of the aligned arrays of the composites to non-aligned ones and discuss the possible degree of conductivity enhancement upon the alignment in this and in analogous systems.

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