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Tellurium-containing conjugated polymers and molecular phosphorescent materials

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Our initial studies into heavy main group element-containing polymers began with the preparation of low band gap polytellurophenes via metallacycle transfer chemistry.¹ These materials show optical band gaps as low as 1.1 eV and open the door for the possible harvesting of triplet excitons in photovoltaics. Later, we uncovered that some of the requisite monomers for our polymer chemistry showed phosphorescence, both in the solid state and in air (conditions that often lead to luminescence quenching). Currently, we are involved with the preparation of new polyacetylenes bearing redox active side groups and hope to extend this methodology to include the incorporation of the heavy element tellurium, primarily to enhance bulk conductivity via interchain Te---Te contacts.