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Energy Transport in Ru(II)- and Os(II)-Loaded Light Harvesting Polymers.

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The excited state energy migration dynamics in a polymeric light harvesting assembly consisting of twenty polypyridyl Ru(II) and Os(II) coordination complexes linked together through a polystyrene backbone have been studied using ultrafast laser techniques. Energy migration is initiated through the photoexcitation of the metal-to-ligand charge-transfer (MLCT) band of one of the Ru complexes. Through energy transfer processes, the Ru excited state hops from one site to another, ultimately being transferred to a lower energy Os trap. The energy migration dynamics are followed by monitoring the Os excited state emission using time-correlated single-photon counting. We have augmented our time-resolved experiments with Monte Carlo simulations. These simulations provide insight into the polymer array's structure and at the same time form the basis of a molecular-level description of the energy migration dynamics. The kinetic model combines a Monte Carlo simulation of the polymer structure with a stochastic simulation of the excited state migration.