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Tuning the Electrical Conductivity of Polyaniline by Controlling the Molecular Characteristics of the Polymer Acid Template JOUNG EUN YOO, Department of Chemical Engineering, University of Texas at Austin, Austin, TX , TRACY BUCHOLZ, YUEH-LIN LOO — We have investigated the electrical conductivity of polyaniline (PANI) that is template synthesized with a polymer acid as a function of the polymer acid molecular characteristics. The polymer acid of choice is poly(2-acrylamino-2-methyl-1-propanesulfonic acid) and it was synthesized by both conventional free-radical polymerization (PAAMPSA) and atom transfer radical polymerization (ATRP); aPAAMPSA. The synthesis of aPAAMPSA is kinetically controlled and thus aPAAMPSA has a narrower molecular weight distribution compared to PAAMPSA. In general, PANI-aPAAMPSA is about twice as conductive as PANI-PAAMPSA of comparable molecular weights. The difference in conductivity is correlated with different crystalline structures observed between PANI-PAAMPSA and PANI-aPAAMPSA. Specifically, the structure of PANI-aPAAMPSA resembles that of PANI doped with AAMPSA, the monomer of PAAMPSA. These results are further corroborated by UV-vis-NIR experiments where the polaron peak becomes broader and is red-shifted with PANI-aPAAMPSA.

Joung Eun Yoo
Department of Chemical Engineering, University of Texas at Austin, Austin, TX

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