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Flexible Battery Cathodes Enabled by Conductive Block Copolymers JODIE LUTKENHAUS, Texas A&M Univ, RAFAEL VERDUZCO, Rice University, HYOSUNG AN, Texas A&M Univ, YEN-HAO LIN, Rice University, LUTKENHAUS LABORATORY COLLABORATION, VERDUZCO LABORATORY COLLABORATION — Alone, or as part of hybrid electrodes, conductive polymers are poised to play an integral role in the new and growing field of flexible or "plastic" power. Here we demonstrate that even small amounts of a poly(3-hexylthiophene)-block-poly(ethylene oxide) (P3HT-b-PEO) block copolymer, acting as an ion and electron conductor, can bring about significant improvements in energy storage and mechanical flexibility for V_2O_5 hybrid cathodes for Li-ion batteries. By following this approach, traditional inert polymer binders and carbon black additives are not needed. V_2O_5 alone has a high theoretical capacity that is limited in practical application by low conductivity. Further, V_2O_5 alone is brittle and breaks upon repeated flexure. P3HT-b-PEO serves to address both these issues. This presentation will cover how these hybrid electrodes are formed and the resulting physicochemical properties that lead to its enhanced flexibility and energy storage.

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