

지속성장 가능한 황 기반 첨단소재(Materials for sustainable growth : Sulfur utilization)

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Ironically, sulfur itself is currently suffering from excessive surplus and low price even though it is mainly produced from crude oil which is thought to be on the brink of depletion. Oil producing countries still have difficulty in figuring out what to do with abundant and cheap sulfur. Despite a number of useful properties of sulfur relevant to advanced materials, synthetic and processing methods with sulfur to prepare well-defined functional materials are currently limited due to its inherently poor physicochemical properties. To address the inherent chemical challenges associated with using elemental sulfur to prepare polymeric materials, we examined the use of molten liquid sulfur as a reaction medium and comonomers. We recently developed chemically stable copolymer materials via the bulk copolymerization of molten sulfur with 1,3-diisopropenylbenzene using a methodology, termed as “inverse vulcanization”. These sulfur-rich copolymers exhibit excellent electrochemical properties relevant to cathode materials for lithium-sulfur battery applications. Moreover, these materials are intriguing candidates for IR optics.