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LOW BANDGAP AND IONIC BONDING
WITH CHARGE TRANSFER THRESHOLD
IN POLYMERIC Li_4C_{60}

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We demonstrate the growth of crystalline Li_4C_{60} films by vacuum distillation. The LEED pattern of the films indicates the formation of polymer chains in the plane of the surface, consistent with the reported crystal structure. The valence band electron energy loss and photoemission spectra indicate that the Li_4C_{60} polymer is a low bandgap semiconductor. The coupling to the soft alkali and intermolecular phonons is not effectively screened as in other fullerides due to the presence of the band gap. Our photoemission data confirm that no hybridization occurs between Li- and C- derived levels. Instead, a partial charge transfer takes place, which is the same for different Li concentrations. This result rationalizes the stability of the polymer phase over a wide stoichiometry range.