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Mechanistic Investigation into the Decarboxylation of Salts of Aromatic Carboxylic Acids and Their Role In Cross-Linking Reactions In Low-Rank Coal

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In previous studies, the thermolysis of simple and polymeric model compounds containing aromatic carboxylic acids was investigated to determine if decarboxylation leads to low-temperature cross-linking reactions in low-rank coals. In this investigation, the role of carboxylate salts in cross-linking reactions was investigated by TG-MS, since the pyrolysis and liquefaction yields of ion-exchanged low-rank coals are influenced by the identity of the cation. The pyrolysis of the sodium, potassium and calcium salts of benzoic acid, poly(m-xylylene-co-5-carboxy-m-xylylene), and poly(p-vinyl benzoic acid co-styrene) with various loadings of carboxyl groups will be compared to the pyrolysis of the free acid. The impact of the cation on the decarboxylation pathways, and the role of carboxylate salts in the low temperature cross-linking of low-rank coals will be discussed.

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