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Rheological and Thermochemical Studies on Polymeric Blends Used as Precursors of Lustrous Carbon

J. Zielinski (a), J. Polaczek (b), W. Ciesinska (a), T. Brzozowska (a),

Z. Machowska (b) and T. Zieliński (b)

(a) Warsaw University of Technology, 09-400 Plock, Poland

(b) Industrial Chemistry Research Institute, 01-793 Warszawa, Poland

Two petroleum-derived aromatic hydrocarbon resins (HRs) were blended (1:1) with expanded polystyrene (EPS) waste and small amounts (up to 10% by mass) of poly(vinyl chloride) (PVC) to increase both the lustrous carbon (LC) yield and softening point of the blends without any deterioration of their rheological characteristics. The blends were prepared and tested for LC content, softening points, melt flow rate, hardness, impact strength as well as for shear stress and apparent viscosity to check their applicability as LC precursors under industrial conditions. The Mettler softening point and Dynstat impact strength of the blends substantially increased, while the Shore hardness decreased as the PVC content was increased. The MFR remained constant up to PVC content 5% and then rapidly dropped at the higher PVC contents. The PVC addition resulted also in an increase in resistance against shear stress, viscosity and thixotropy of the blends. The LC yield decreased at higher compounding temperatures and times but increased as the PVC content was raised (up to 5%). The blends met the requirements of the manufacturers of molding sands.