Abstract Submitted
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Inelastic behavior in polycarbonate blends SURESH AHUJA, Retired — Polycarbonate offers a challenging opportunity because of its industrial importance from carbon nano-tubes, ceramics and to Electrophotography. Anti-plasticization shows anomalous inelastic behavior in brittle ductile transition and in stress strain, stress strain rate response. Poly (methylmethacrylate), polystyrene, and polycarbonate are strongly rate dependent, Nano-indentation is a way of determining surface deformation and effect of strain and strain rate behavior of complex surfaces. Hardness and modulus depend on the indentation depth or load, exhibiting the well-known Indentation Size Effect (ISE). A decrease in the hardness with increasing indentation depth or load has been observed in numerous micro or nano-indentation tests on various materials such as metals, diamond-like carbon, polymers, ceramics, etc. which may be called the normal ISE. The inverse ISE has also been reported, in which the hardness increases with increasing indentation depth or load. There are unique properties such as indentation affects resulting in strain softening and strain hardening. There is differentiation in structure with the depth exhibited in variation of Tg. Hertzian and non-linear deformation models including usage of Finite Element Method offer opportunity in analyzing nano-indentation. Presence of diamine in polycarbonate results in making the surface and bulk brittle and acts as an anti-plasticizer by increasing its modulus, yield stress and reducing strain to break. Data on modulus and hardness of polycarbonate and blends of diamine as function of depth (strain) and strain rate are presented and compared to inelastic models.

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