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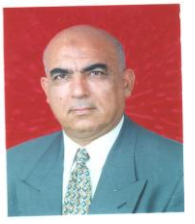

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Academic Research interests:	• A thermodynamic theory was formulated to assess the long-term strength of protective coating and a testing apparatus to measure the rate of adhesive failure at the solid-coating interfaces (Constrained Blister Test) was designed. The test allows for slow detachment rate under constant pressure with suppressed coating deformation. A similar configuration has been developed for testing of the efficacy of protective coating formulations in inhibiting interfacial corrosion. • A classification scheme with four distinct categories of morphology of Ethylene-octene copolymers (Dow's INSITE™) and the corresponding mechanical characteristics was developed. Materials with densities higher than 0.93 g/cc, type IV, exhibit a lamellar morphology with well-developed spherulitic superstructure. Type III polymers with densities between 0.93 and 0.91 g/cc have thinner lamellae and smaller spherulites. Type II materials with densities between 0.91 and 0.89 g/cc have a mixed morphology of small lamellae and bundled crystals. These materials can form very small spherulites. Type I copolymers with densities less than 0.89 g/cc have no lamellae or spherulites. Fringed micellar or bundled crystals are inferred from the low degree of crystallinity, the low melting temperature, and the granular, nonlamellar morphology. • Novel composite materials has been prepared by intercalating monomers or functionalized polymers at the interlayer spacing of montimorillonite and their structural hierarchy has been established. • Ternary polymeric blends with superior mechanical properties have

	been prepared by selecting two of the three components with specific reactivity through specific functional groups. Nano structures developed from the chemically driven mixing are believed responsible for the superior mechanical performance. • A theory for slow crack growth (Crack Layer Theory), based on thermodynamics of irreversible processes, was introduced. The theory ascribes the crack propagation resistance to the specific enthalpy of (crack tip) damage, a material constant, and a rate dependent dissipative coefficient. The exactitude of the theory has been demonstrated in several materials.