

Abstract: One of the known contributors to the physical failure of coating or adhesive applications is the shrinkage stress which develops as a solid film is formed from a solution, dispersion, or reactive mixture. As a first examination of the magnitude of such shrinkage stresses in art and restoration materials, we have determined the stresses which develop in films of thermoplastic polymers cast from toluene solutions, by measuring the curvature of a flexible poly(vinyl acetates) and poly(methacrylates), chosen to include several common coating materials and to span a range of physical and chemical properties. The results have been compared with a theory on the development of internal stress in films of solvent-based thermoplastic polymers. The theory correlates the magnitude of internal stress in the film with the amount of solvent which evaporates from the film after it has 'solidified'.