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Effect of Intermolecular Hydrogen Bonding on the Dynamics of Poly (2-vinylpyridine) Mixtures Containing Low Molecular Weight Phenolic Compounds¹ PORNPEN ATORNGITJAWAT, Burapha University, ROBERT KLEIN, Sandia National Laboratories, AMANDA MCDERMOTT, PAUL PAINTER, JAMES RUNT, Penn State University — The dynamics of poly(2-vinylpyridine) (P2VPy) mixed with a series of low molecular weight phenolic molecules (containing one to six hydroxyl groups) were investigated using broadband dielectric spectroscopy. For all mixtures, FTIR spectroscopy indicates significant intermolecular H-bonding. All mixtures were single phase except for that containing 10 mol% hexahydroxybenzophenone, which formed a H-bonded complex with P2VPy. Intermolecular hydrogen bonding resulted in significant suppression of the P2VPy local relaxation in the glassy state. The segmental relaxations for mixtures containing 30 and 50% polyhydroxy compounds were broadened, indicating dynamic heterogeneity, whereas all P2VPy - ethylphenol mixtures exhibited dynamic homogeneity. Changes in relaxation strength of the segmental process are considered in light of calculated dipole moments for all species under investigation.

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