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Partial osmotic compressibility of binary mixtures of colloidal nanoparticles and PEG JINXIN FU, MELISSA GOLEB, H. DANIEL OUYANG, Lehigh University — Proposed originally by Oosawa and Asakura, polymer crowding-induced attractive force between colloidal particles is being used in a variety of applications ranging from protein crystallization to nanoparticle sorting. While the force has been well studied for a pair of micro particles in the presence of polymers, direct measurement of such force between nanoparticles is very difficult. To investigate effects of crowding polymers, we propose an approach to measure the colloidal osmotic compressibility and viral coefficients in the presence of polymers and compare experimental results with theoretical models. The materials we investigated are binary mixtures of fluorescent polystyrene nanospheres (100 – 210 nm in diameter) and polyethylene glycol (PEG). Using fluorescence microscopy to examine the change of the particle concentration in an optical trap, which exerts no force upon PEG, allows us to measure the partial osmotic compressibility of the particles. The measured partial compressibility and its virial expansion are compared with theoretical calculations to elucidate the competing effects of polymer crowding and adsorption.

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