Effects of a solute on a simple model solvent\textsuperscript{1} PAOLO DE GREGORIO, JONATHAN C. TOLEDO, B. WIDOM, Department of Chemistry, Baker Laboratory, Cornell University, Ithaca NY, USA — We studied the effect of the addition of a solute on a one-dimensional model solvent (high density, low compressibility, low coefficient of thermal expansion), at infinite dilution. The solute has a solubility which is low and decreases with increasing temperature. The effect of the addition of solutes on the chemical potential of the solvent at constant volume differs from that at constant pressure in a way similar to that of non-polar solutes in water. The solvent-solvent pair distribution function determines fully the modes of decay of the solute-solute counterpart. At the largest distances, the ultimate decay is strictly monotonic (exponential) for both. But while for the solvent-solvent correlations the amplitude associated with that mode is negligible, it is huge for the solute-solute case. Formally, the correlations vanish in identical fashion at infinite distances, but they differ substantially over an extended range of physical interest. The osmotic second virial coefficient is very large and negative, not only as an effect of the proximity ‘attraction’ between the solutes, but also of the very long tail in the correlations.

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