

Abstract Submitted  
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**Cross-over of hydrophobic effects observed in amphiphilic aqueous solutions**<sup>1</sup> NINGDONG HUANG, student, DENNIS NORDLUND, CONG-CONG HUANG, TOLEK TYLISZCZAK, YVES ACREMANN, ANDERS NILSSON, STANFORD UNIVERSITY COLLABORATION — The hydrophobic effect is important in nature and responsible for phenomena in many fields. Changes in structure and dynamics of water induced by apolar groups are believed to play a key role in protein folding, ligand binding and formation of biological membranes. The length scale dependence of hydrophobic and associated crossover length has been discussed intensively, but has not been observed directly by experimental techniques sensitive to the microscopic structure. Here we report experimental evidences for the cross over behavior of hydrophobic effects in amphiphilic aqueous solutions based on x-ray adsorption and small angle x-ray scattering data. Tetraalkyl ammonium ( $C_nH_{2n+1}$ )<sub>4</sub>N<sup>+</sup> (TAA) cations show hydrophobic effects on the structure of water other than ionic effects. For cations with shorter side hydrocarbon chains, hydrophobic hydration enhances the hydrogen bonds (HBs) in liquid water and separates the solute with solvents; whereas for cations with longer chains ( $\sim 5$  Å) we find that the HBs are weakened and the solutes and solvent are attracted to each other. The temperature dependence of the crossover length is also investigated.

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