

# Specific ion effects at interfaces

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## **Abstract:**

Ions have profound impact on very many physico-chemical and biological processes. In 1888, Franz Hofmeister has classified the ions based on its effectiveness towards 'salting in' or 'salting out' of proteins from aqueous solutions [1]. The sequence for anions and cations are:  $\text{Cl}^- > \text{NO}_3^- > \text{Br}^- > \text{ClO}_4^- \sim \text{SCN}^-$  and  $\text{Cs}^+ < \text{Rb}^+ < \text{NH}_4^+ < \text{K}^+ < \text{Na}^+ < \text{Li}^+ < \text{Ca}^{2+} < \text{Mg}^{2+} < \text{Zn}^{2+}$ , respectively. Such a sequence is also found to be applicable to properties like surface tension, surface potential and viscosity of aqueous salt solution, foam stability, cloud point temperature, micellar growth, enzyme activity, aggregation of amyloid fibrils and phase sequence in lyotropic liquid crystals [2]. In some cases, the sequence is also found to be reversed and depends on salt concentration [3].

Classical electrostatics fail to describe these puzzling behavior even for ions with same valency. Several refinements were introduced taking into account the ion size, valency, polarizability, hydration characteristics, chemical (direct ion binding) and solvent interactions to explain the specific ion effects in the literature [4]. The salt and the solvent effects at interfaces is also known to play a major role [5]. Our efforts towards understanding the role of ions at air-aqueous electrolyte, lipid-electrolyte and liquid crystal-aqueous electrolyte interfaces will also be discussed.

## References:

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