

# Interacting Nano-Particles with Functional Surface Groups

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The interaction potential ( $W$ ) between nanoparticles coated with ligands containing ionizable end-groups are shown to influence the charge regulation of the functional end-groups as their separation ( $D$ ) decreases. This induces an asymmetric distribution of charged end-groups, and confers a preferred directionality in nanoparticle-nanoparticle interactions to avoid an increase in counterion confinement (condensation) in the region between nanoparticles. The fraction ( $f$ ) of ionized groups depends on ionic strength, pH value,  $D$ , ligand length and grafting density.

