CHBE 470/ENCH 648f: The Science and Technology of Colloidal Systems

Fall 2019

Instructor: Prof. Taylor Woehl

Time: 5:00 – 6:15 Tuesday, Thursday, AJC 2119

Prerequisites: CHBE424, CHBE426 or equivalent

Topics covered:

1.) Theory of colloidal stability: DLVO theory, colloidal hydrodynamics (Brownian motion, Stokes flow, Faxen's law), classical colloidal interactions, colloidal aggregation, non-classical colloids interactions

2.) Interfacial thermodynamics: electrified interfaces, double layer theory, surface chemistry

3.) Electrokinetics: Behavior and manipulation of colloids in electric fields, electroosmosis, induced charge electrophoresis, dielectric dispersion

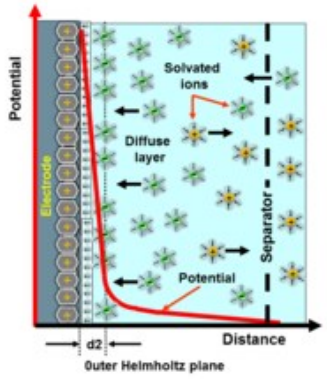
4.) Nanomaterials: Nucleation and crystallization, coarsening mechanisms, Lamer Model, non-classical nanocrystal formation mechanisms

5.) Applications: Applications and real world uses of colloids and nanomaterials

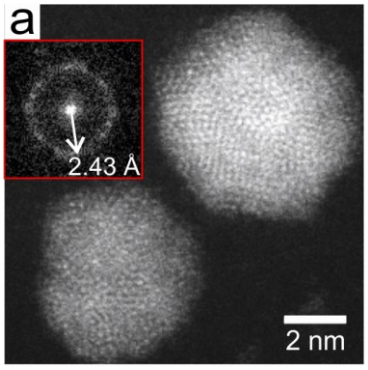
One-week lab module:

Synthesize colloidal nanoparticles and measure their optical properties!

Double layer theory



Colloidal nanocrystals



Electrokinetics