



Der Vorsitzende des Promotionsausschusses

EINLADUNG

Hiermit lade ich ein zum öffentlichen Promotionskolloquium von

Herrn M.Sc. Tobias Valentin Knapp
Kolloid- und Grenzflächenchemie
(Prof. Dr. Tobias Kraus)

am

Freitag, 10. April 2026, 14:00 Uhr s.t.

per Videokonferenz: Link für MS Teams:

[Promotionskolloquium Herr Tobias Knapp | Besprechung beitreten | Microsoft Teams](#)

Raum für die Prüfung: Leibniz-Saal, Gebäude D 2.5 (INM - Leibniz Institut für Neue Materialien)

Thema der Dissertation:

Stabilization Mechanisms of Non-Polar Metal Colloids with Thin Organic Shells

Apolar metal nanoparticles are stabilized by ligand shells, allowing their use as building blocks for functional materials. This dissertation explores how modifying the ligand shell affects colloidal and shape stability. Colloidal stability—the ability of particles to stay dispersed—depends on the shell's structure. Partially replacing ligands with small molecules slightly improved stability, while branched ligands significantly enhanced it by preventing shell ordering. Mixed ligand shells showed that stability is influenced by molecular size differences and ligand distribution. Shape stability refers to the core's resistance to structural change. Partial ligand exchange with tetrahydrothiophene reduced the shell's protective effect, enabling controlled coarsening at moderate temperatures and the formation of porous gold "sponges" through self-assembly.

Saarbrücken, 27. März 2026


Prof. Dr.-Ing. Georg Frey