Denver

CHEMISTRY

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Seminar Series

11am-12pm

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Zoom

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"Thiolate-Protected Metal Clusters: Chirality and Dynamic Nature"

Chirality at the nanoscale has gained considerable interest in recent years. Chiral nanomaterials have properties that are of interest for applications in chiral technology but also in materials science. In this contribution we will focus on a special class of materials: Thiolate-protected metal clusters. These atomically well-defined objects could be used as building blocks for nanotechnology, as catalysts or as sensors. We will discuss the preparation of chiral gold clusters [1], their chiroptical properties and the transfer of chirality within the ligand shell as well as between cluster and ligand [2].

These clusters, although stable, turn out to be very dynamic. The latter is evidenced by the exchange of metal atoms and ligands between clusters as well as between clusters and surfaces. In addition, chiral clusters can undergo racemization. The latter property is usually unwanted but we will show that the interplay between racemization of a cluster and exchange of a chiral ligand can lead to amplification of enantiomeric excess [3].

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[1] T. G. Schaaff, G. Knight, M. N. Shafigullin, R. F. Borkman, R. L. Whetten, J. Phys. Chem. B **102**, 10643 (2009).

[2] I. Dolamic, B. Varnholt, T. Bürgi, Nature Commun. **6**, 7117 (2015).

[3] Y. Wang, B. Nieto-Ortega, T. Bürgi, Nature Commun. **11**, 4562 (2020).