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Metal-Bonded Redox-Active Triarylamines and Their Interactions: Synthesis, Structure, and Redox Properties of Paddle-Wheel Copper Complexes






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Invited for this month's cover picture is the group of Professor Winfried Plass at the Institute of Inorganic and Analytical Chemistry, Friedrich Schiller University, Jena (Germany). The cover picture shows a scene illustrating the need to investigate the properties of building blocks for complex systems to enable the basic design of new functional materials. The utilized triphenylamine ligands are constituting parts of the currently investigated "Jena University Magnetic Polymer" (JUMP) series. Read the full text of their Full Paper at 10.1002/open.201800243.

What prompted you to investigate this topic?

As natural scientists, we try to find answers for thrilling observations. To do so, we are looking for properties of matter and its constituting parts. As chemists, we are particularly interested in utilizing the bottom-up approach to generate new functional materials. Although this can lead to emerging properties, a thorough understanding of the basic building blocks and their interactions is essential. As triarylamines are well-known organics with interesting electronic and redox properties, we became interested in their combination with and communication across metal cores.

Does the research open other avenues that you would like to investigate?

The combinability of the simple copper paddle-wheel units with the triphenylamine backbone to form complexes, which are fairly easy to oxidize while retaining their structural stability, is promising. This should allow us to incorporate other metal-based clusters into triphenylamine linkages to even generate extended frameworks. As a consequence, combinations with relevant metal-based magnetic units can be envisaged, such as cobalt(II) or dysprosium(III). For a magnetochemist, this leads to the tantalizing prospect of inducing magnetic interactions within a given network by external triggers virtually at wish.

What other topics are you working on at the moment?

Part of the research in our group is currently focused on using triphenylamine linkers to generate new examples along the alley of our JUMP materials. Besides that, we are curiosity-driven inorganic coordination chemists with a strong physico-chemical background interested in homo- and hetereometallic complexes and coordination polymers. Our general interests range from metal ions in biological systems and their catalytic activity to magnetochemistry and materials science. A complementary approach to our experimental studies is provided by quantum-chemical investigations particularly as a means to generate a deeper insight into the behavior of the resulting materials.