Synthesis and Applications of Metal-Organic Knots

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Trefoil knots are the most frequently observed knotted topology in proteins. It is speculated that knotted topologies play important roles in protein function by enhancing their catalytic activity, ligand-binding affinity, and increasing their macromolecular thermodynamic, kinetic, and mechanical stability. Co-ordination driven self-assembly has been established as a nice protocol towards the synthesis of complex architectures including molecular knots. However reports on the practical application and utility of such molecular knots remain very limited. In my talk I will be discussing the preparation of different metal-based trefoil knots and their use in three new applications: (i) catalysis,[1] (ii) protein-protein interactions inhibition,[2] and (iii) cancer therapy.[3]

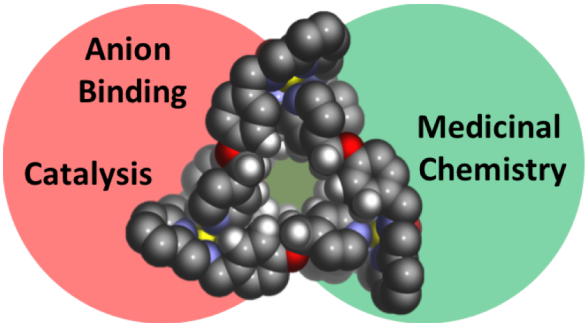

Figure 1. *Single crystal structure of a metal-organic knot and the applications used for.*

1. [1]Prakasam, T.; Devaraj, A.; Saha, R.; Matteo Lusi, M.; Olson, M. A.; Brandel, J.; Esteban-Gómez, D.; Platas-Iglesias, C.; Mukherjee, P. S.; Trabolsi, A. under review.
2. Prakasam, T.; Cantarutti, C.; Sharma, S. K.; Jagannathan, R.; Palmisano, G.; Giorgetti, S.; Corazza, A.; Bellotti, V.; Fogolari, F.; Olsen, J.-C.; Trabolsi, A.; Esposito, G.; under review.
3. Benyettou, F.; Prakasam, T.; Nair, A. R.; Gunn, I.-I.; Skorjanc, T.; Alhashimi, M.; Edelpi, K. S.; Trabolsi, A. under review.