

CHIRAL-COPPER(II) COMPLEXES ANCHORED ON CARBOXYLATED GRAPHENE OXIDE FOR CATALYTIC APPLICATIONS

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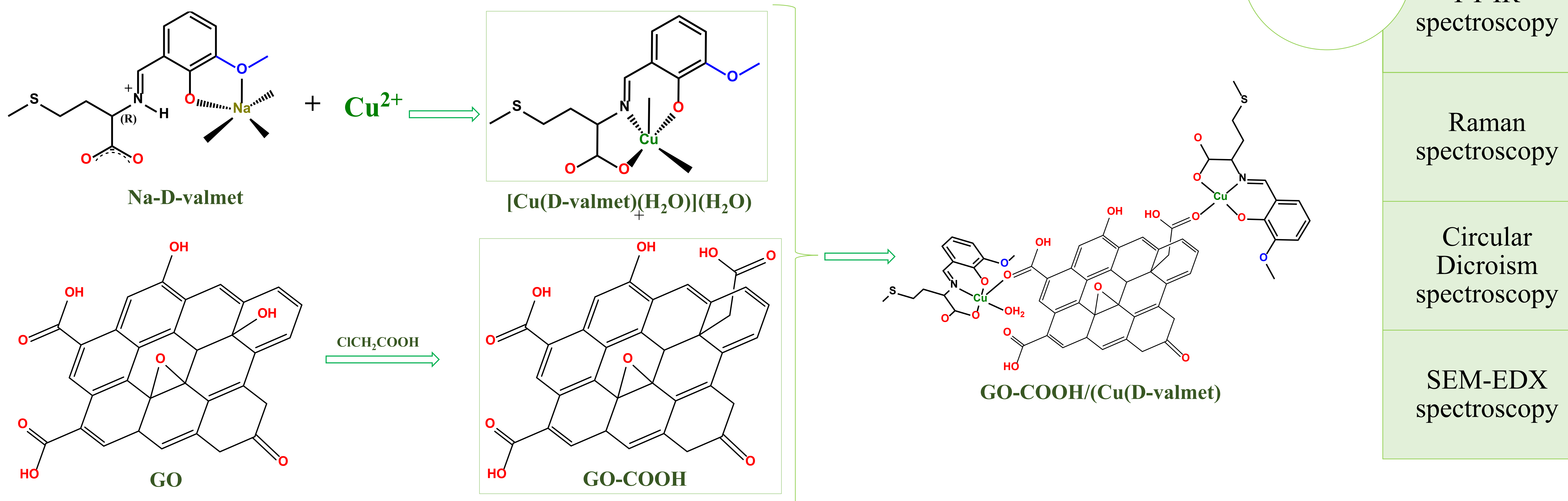
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Introduction

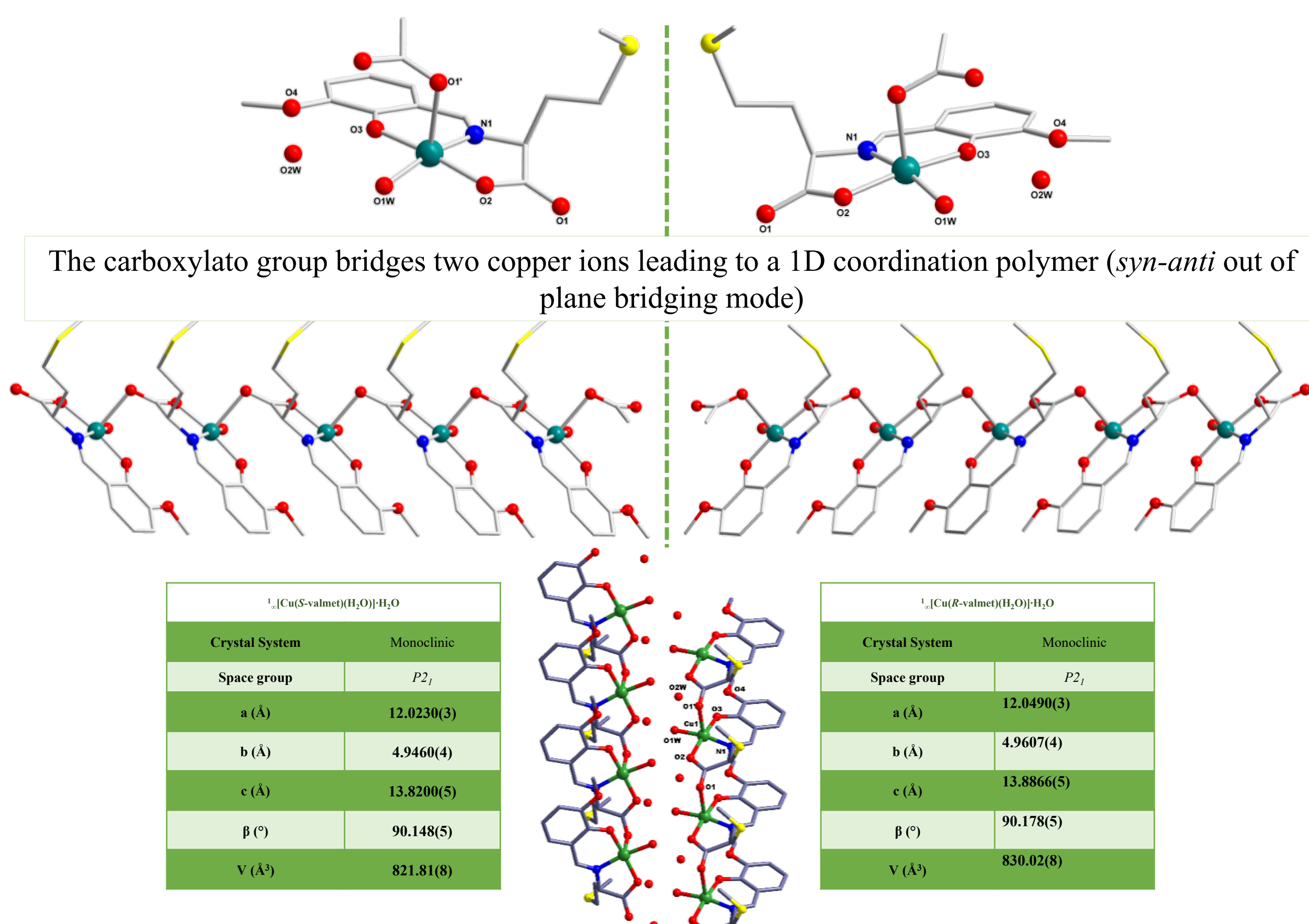
Immobilization of metal complexes on solid supports is an efficient method for the synthesis of hybrid catalysts, combining the advantages of homogenous and heterogenous catalysis. In this study, two new chiral hybrid systems, GO-COOH/(Cu(D-valmet)) and GO-COOH/Cu(L-valmet), were synthesized by anchoring the copper(II) complexes onto the surface of carboxylated graphene oxide through covalent and non-covalent interactions. The catalytic activity of the new materials was investigated for the asymmetric Henry reaction of benzaldehyde with nitro-methane.

Experimental

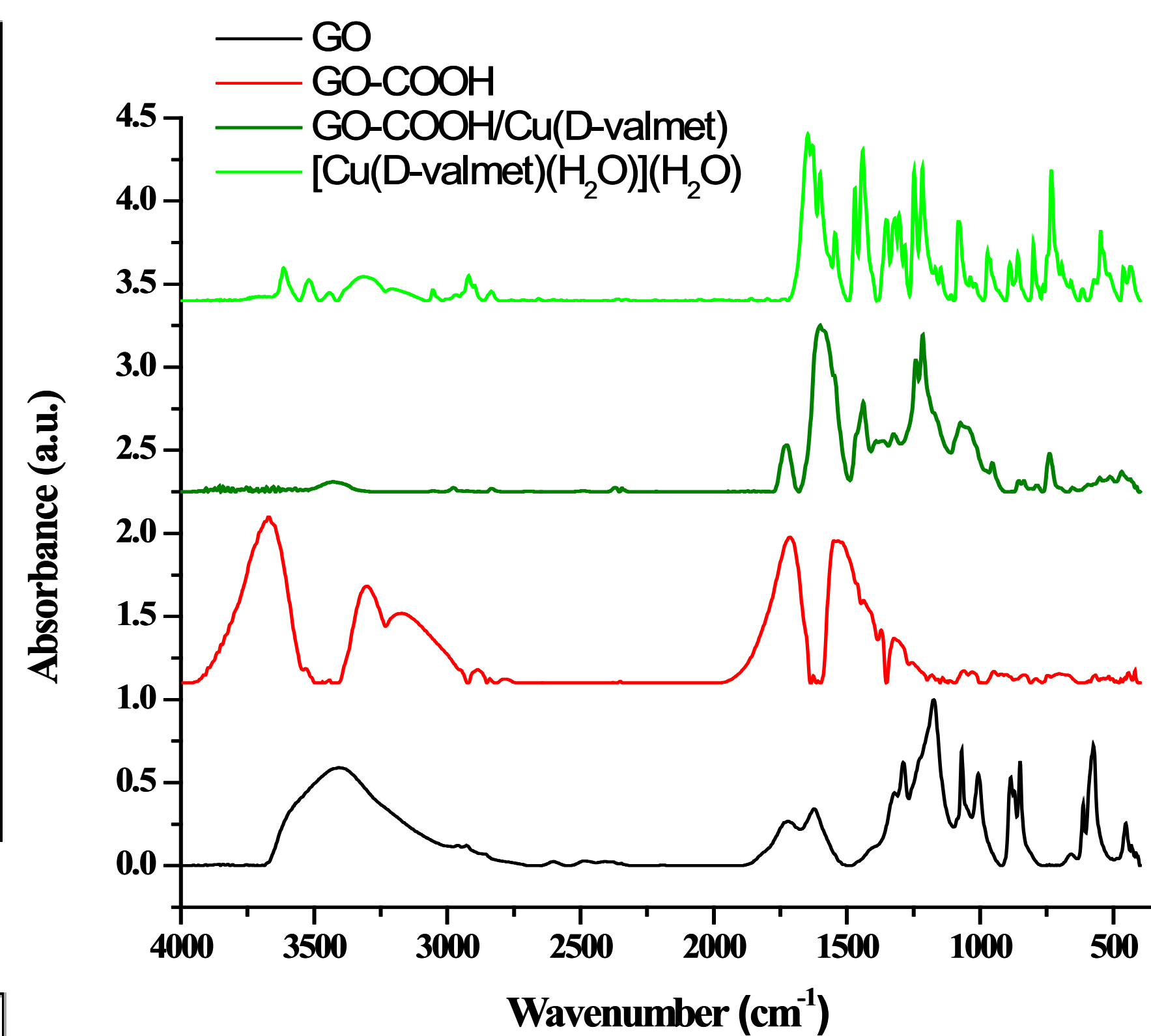
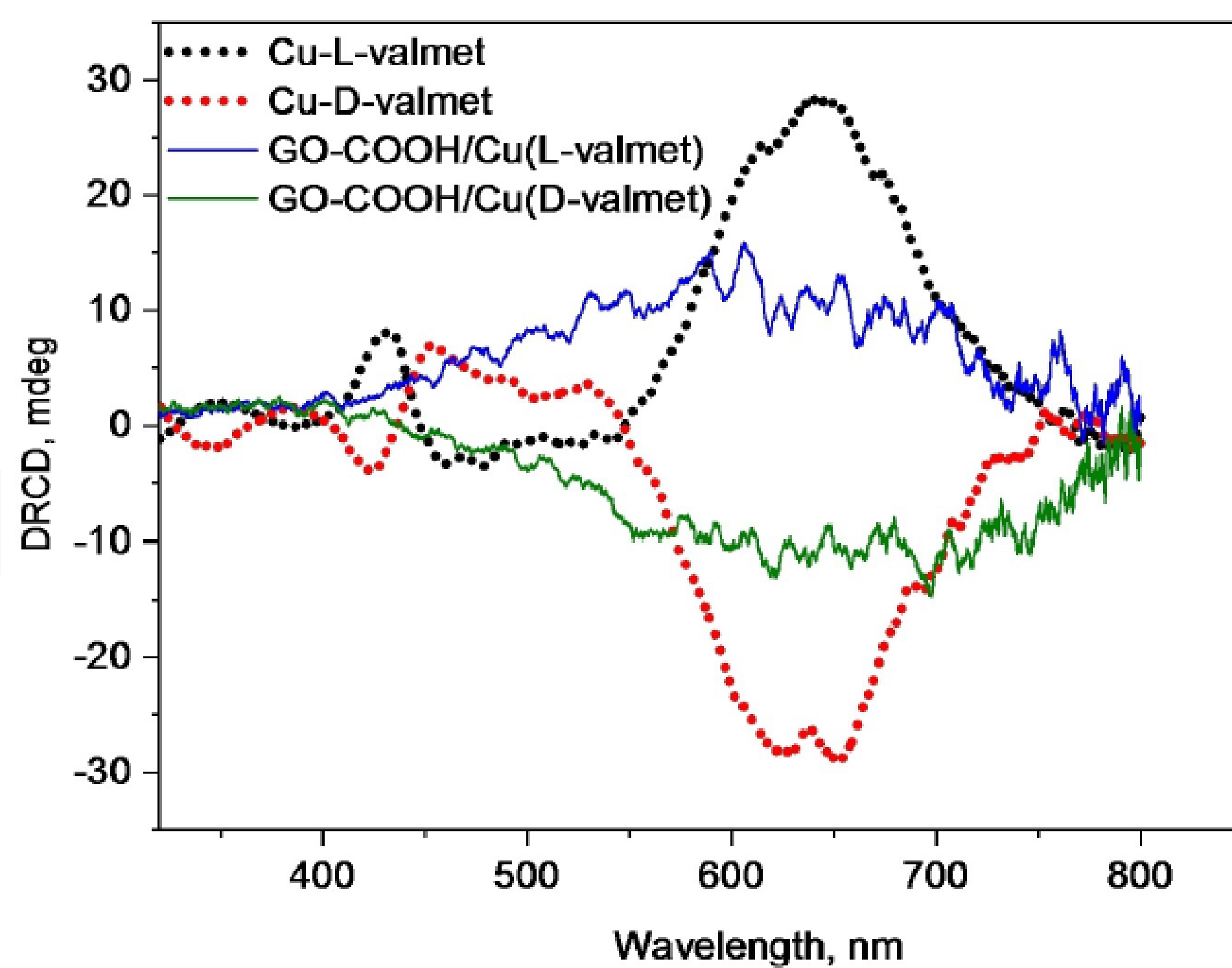
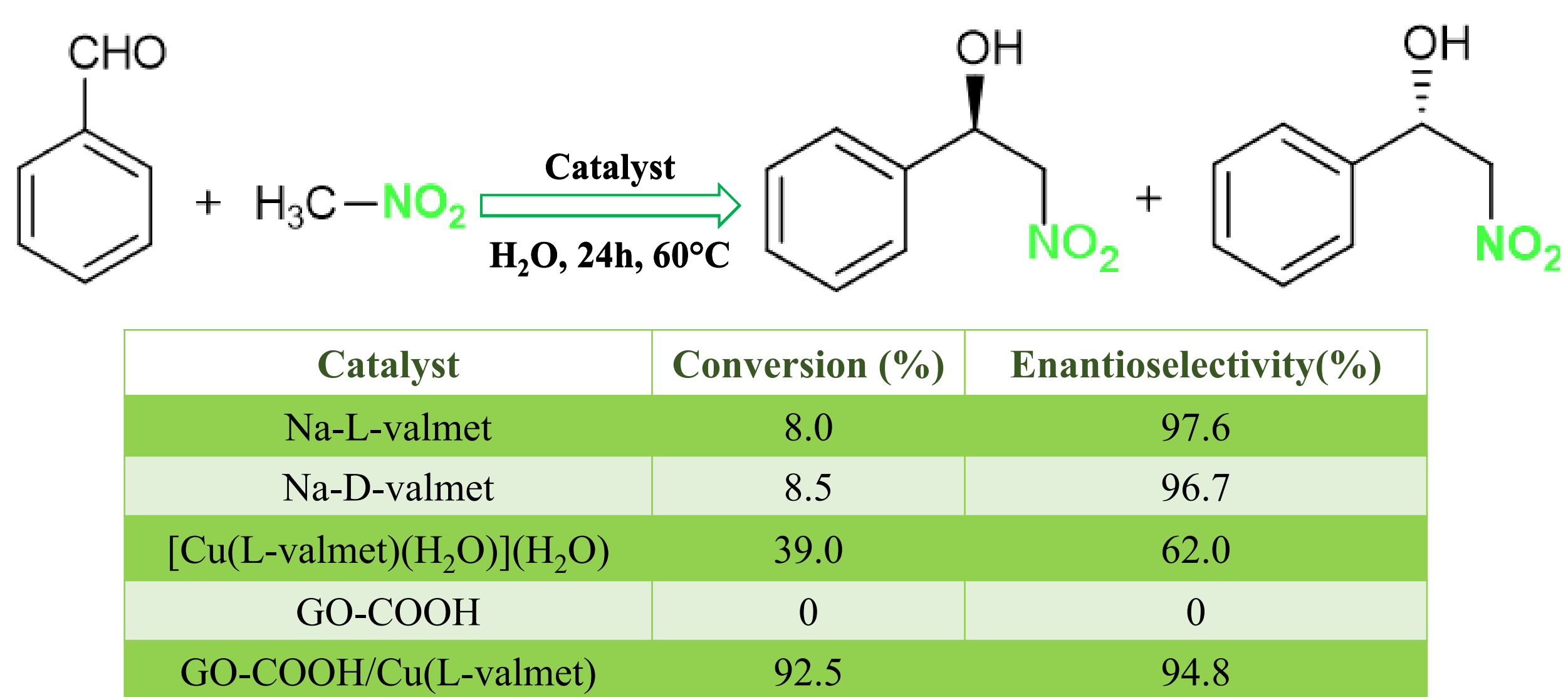
General synthesis scheme



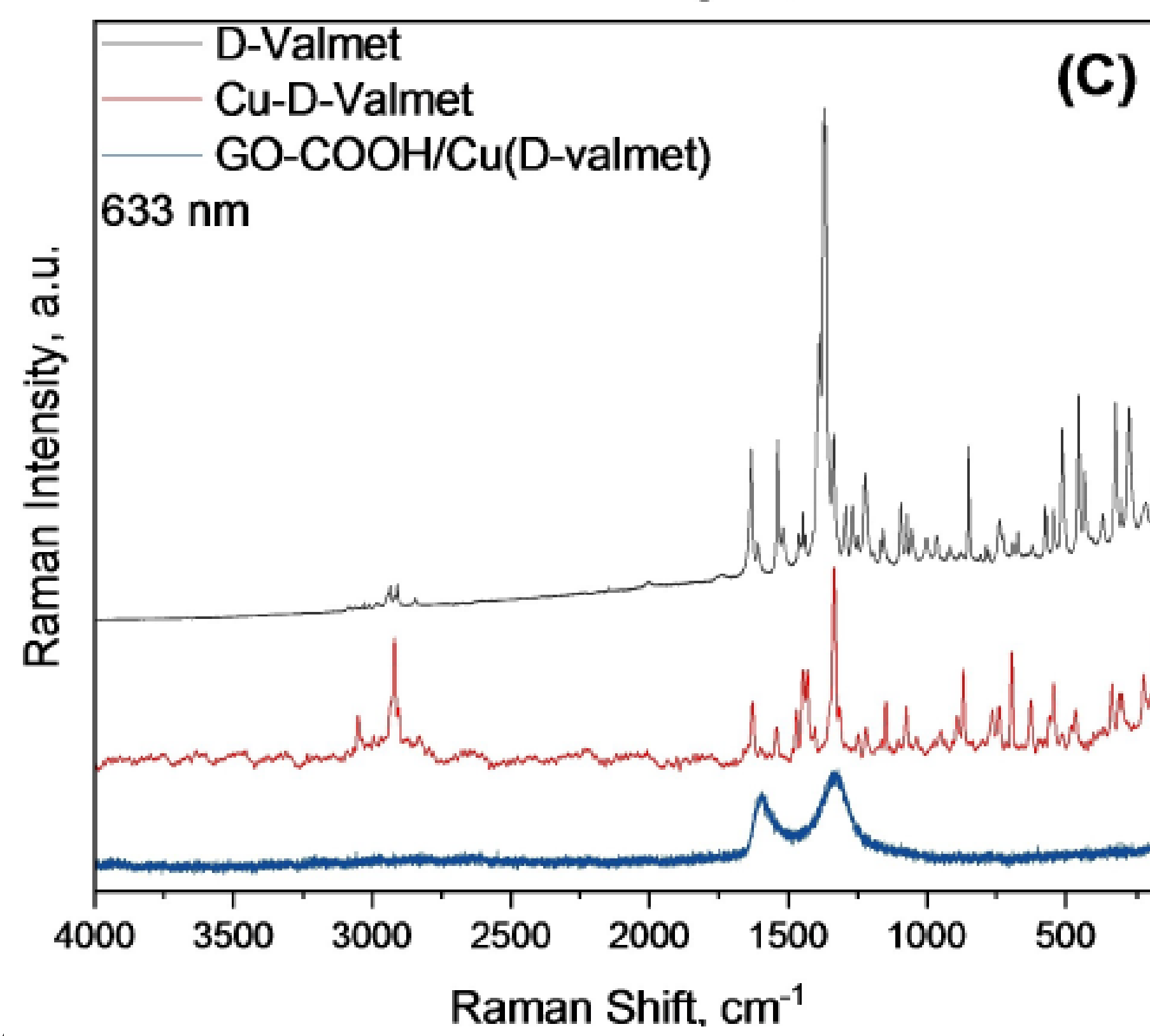
Results



$[\text{Cu}(\text{S-valmet})(\text{H}_2\text{O})] \cdot \text{H}_2\text{O}$ (2-S) and $[\text{Cu}(\text{R-valmet})(\text{H}_2\text{O})] \cdot \text{H}_2\text{O}$ (2-R)

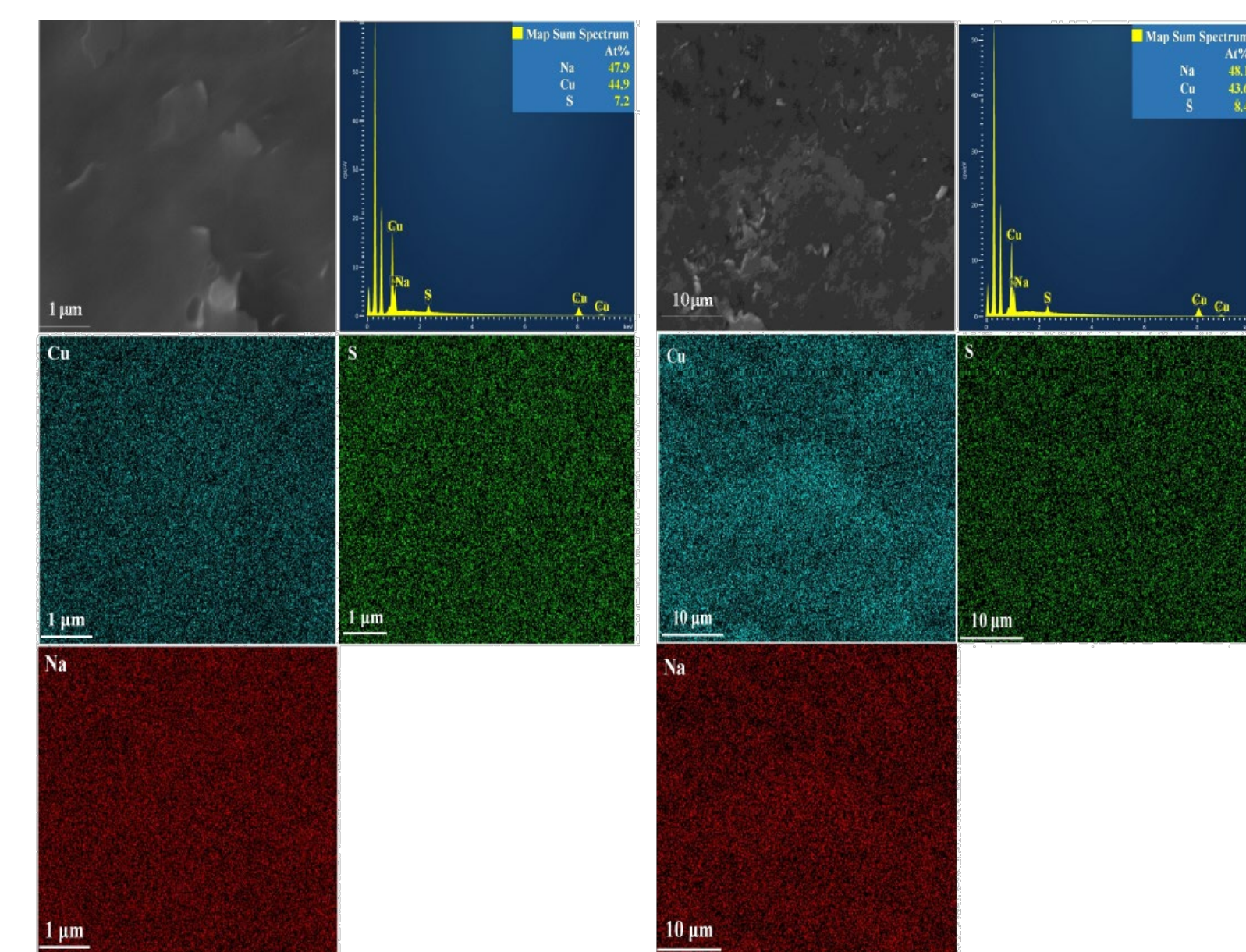


Wavenumber (cm^{-1})	Band assignment
3400	ν_{OH}
1720	ν_{COOH}
1630	$\nu_{\text{C=N}}$
1446	$\delta_{\text{C}_6\text{H}_6}$
1217	$\nu_{\text{C-O}}$ (phenoxy)
1070	$\nu_{\text{C-O}}$ (epoxy)



References:

- [1] Ene, C.D., Maxim, C., Rouzières, M., Clérac, R., Avarvarei, N., Chem. Eur. J., 24 (2018), 8569-8576
- [2] Hummers, W.E., Offeman, R.E., J. Am. Chem. Soc., 80 (1958), 1339-1339
- [3] Guo, S., Raya, J., Ji, D., Nishina, Y., Menard-Moyon, C., Bianco, B., Nanoscale Adv., 2 (2020), 4085-4092.



SEM images and EDX spectra measured for GO-COOH/(Cu(L-valmet))

Conclusions

- Two new hybrid materials were successfully synthesized and their catalytic activity has been investigated.
- The immobilization of chiral copper(II) complexes onto the surface of carboxylated graphene oxide was an efficient method for the preparation of new heterogenous catalysts for the asymmetric Henry reaction.