Metal Carbonyl compounds: Application as PhotoCORMs

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CO plays crucial roles as a signaling molecule in various physiological processes, including neuronal signaling, regulation of neurotransmitters, and vasorelaxation. Its vasorelaxant and cardiac protective effects accentuating its significance in multiple systems, including the immune, respiratory, reproductive, gastrointestinal, kidney, and liver systems[1]. Carbon monoxide release molecules have been studied for instance photodynamic therapy. Among various photoCORMs with different metal centers and oxidation states, those containing manganese(I) stand out. The d^6 electronic configuration and the atomic radius of manganese(I) enable the formation of stable bonds with bidentate or tridentate chelating ligands, preserving its photoactive capacity [2]. The stability of these bonds allows structural modifications in the organic part of manganese(I) coordination compounds, influencing the properties of CO photodissociation. Herein we synthesized and characterized four Mn(I) compounds and conduct a comprehensive evaluation of their CO photorelease. Evaluation of CO release from photoCORMs under physiological conditions is typically performed by studying myoglobin carboxylation. The single band at 560 nm present in the deoxymioglobyn (deoxy-Mb), upon coordination with CO gas, changing the spectrum for (CO-Mb) with two absorption bands around 540 and 560 nm attributed to carboxy-Mb (CO-Mb).[3] This spectrophotometric methodology utilizing myoglobin carboxylation serves as a standard approach for analyzing CO release from photoCORMs. The data showed the capture of ca 2 moles of CO per mole of Mb under light, showing potential application as photoCORMs.

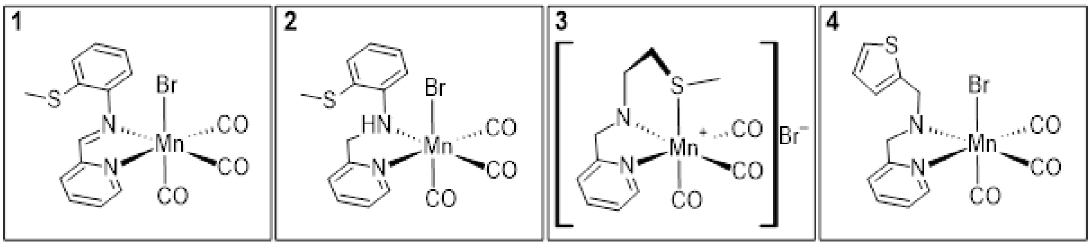

Figure 1. Proposed structures for 1) $[(L^1)Mn(CO)_3Br]$, 2) $[(L^2)Mn(CO)_3Br]$, 3) $[(L^3)Mn(CO)_3Br]$ and 4) $[(L^4)Mn(CO)_3Br]$.

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References

[1] F. Zobi, Future Med. Chem., **5**, 175–188, (2013).
[2] R. Kretschmer, *et al.*, J. Inorg. Biochem., **105**, 6–9, (2011).
[3] A. J. Atkin *et al.*, Dalt. Trans., **40**, 5755–5761, (2011).