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Cryo-electrochemical and spectroelectrochemical approaches for the activation of inert C-H bond by copper-oxygen transient species

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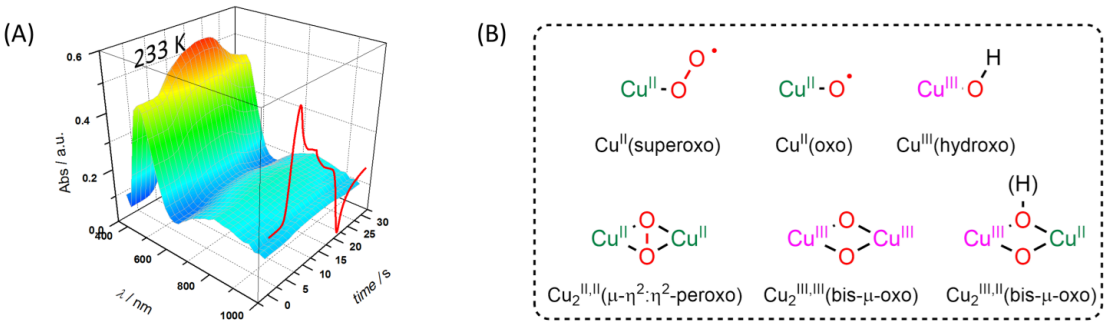
The development of energy-efficient, environmentally benign and cost-effective catalysts which can selectively oxidize C-H bond of alkanes, such as methane, remains a formidable social challenge. Current research is moving towards molecular Cu-based catalysts which use O_2 as oxidant and are inspired from the active site of two specific copper monooxygenases, namely pMMO and LPMO.[1-3] So far, very few redox data have been reported for these reactive copper-oxygen catalysts because of their high instability. In this context, we have developed an original cryo-spectroelectrochemical approach which allows the *in-situ* generation and time-resolved characterization of these transient copper-oxygen species.[4-7] Moreover, we currently investigate the oxidation of hydrogenated substrates by these adducts.



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