Time-resolved interception of multiple charge accumulation in a sensitizer-acceptor dyad

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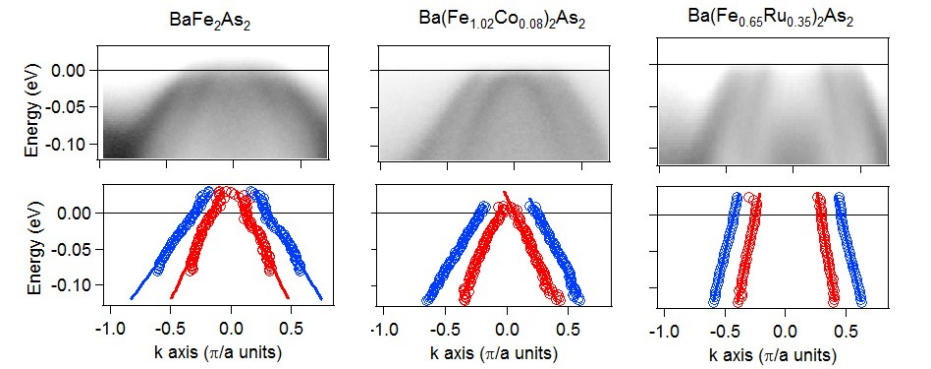
Biomimetic models that contain elements of the photosynthesis are fundamental in the development of synthetic systems that can use sunlight to produce a fuel. The critical task consists in running several rounds of light-induced charge separation required to accumulate enough redox equivalents at the catalytic sites for the target chemistry to occur. Long-lived first charge separated state and distinct electronic signatures for the sequential charge accumulated species are essential features to track these events on a spectroscopic ground. In the present work, we use a novel double-excitation nanosecond pump-pump-probe experiment to interrogate two successive rounds of photo-induced electron transfer on a molecular dyad containing a naphthalene diimide (NDI) linked to a [Ru(bpy)3]2+ chromophore using a reversible electron donor. We report on an unprecedented long-lived two electrons charge accumulated (t = 0.2 ms).



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Résultats obtenus dans le cadre du projet SOLARCAPTE financé par le thème émergence du LabEx PALM et porté par Thomas Pinot (ISMO, UPSud), Winfrield Leibl (iBiTec-S), Ally Aukauloo (ICCMO) et Thai Pham (SOLEIL).