Intramolecular dynamics vs solvation dynamics in the case of molecules deposited on argon clusters

Aude Lietard[1], Slim Awali[1], Marc-André Gaveau[1], Benoît Soep[2], Jean-Michel Mestdagh[1], **Lionel Poisson[2]**

[1] *Université Paris-Saclay, CEA, LIDYL, 91191, Gif-sur-Yvette, France.*
[2] *Université Paris-Saclay, CNRS, Institut des Sciences Moléculaires d'Orsay, 91405, Orsay, France.*

Deposition of molecules on argon cluster is a method of choice to model experimentally the solvation dynamics of excited species[1]. Here, we present the dynamics of two types of molecules in such environment. First, 1,4-Diazabicyclo(2.2.2)octane (DABCO), which is a model molecule. It was excited in the first excited state, a long-lived state. A complex multiscale dynamics is observed. It reveals subtle couplings between the clusters and the molecule[2]. Second, a series of dithienylethene molecules were investigated because they have photochromic properties. The latter are due to an intramolecular electrocyclic reaction. The corresponding dynamics is largely documented in the literature in various environments: gas phase, liquid phase and crystalline phase. The present study within finite size argon clusters enlightens the dynamical role of the solvent, explaining differences observed in the dynamics between the different phases[3].

Contact Information: *lionel.poisson@universite-paris-saclay.fr*

[1] M. Briant, et al. *Phys. Chem. Chem. Phys.* **2022**, *24*, 9807-9835. http://doi.org/10.1039/d1cp05783a
[2] S. Awali, et al. *J. Phys. Chem. A* **2021**, *125*, 4341-4351. http://doi.org/10.1021/acs.jpca.1c01942
[3] A. Lietard, et al. *Phys. Chem. Chem. Phys.* **2022**, *24*, 9807. http://doi.org/10.1039/d1cp05729d