On the Intrinsic Optical Properties of Tetrathiafulvalene Radical Cations and Isomers

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We have studied the intrinsic optical properties of tetrathiafulvalene (TTF), its alkylthio-substituted derivative tetramethylthiotetrathiafulvalene (TMT-TTF) and its isomer tetrathianaphthalene (TTN) as radical cations [1]. Our gas phase experiments provide answers to two questions. First, is the low energy absorption found for TMT-TTF in solution a result of π-dimer formation? Second, do the two isomers TTF and TTN interconvert and co-exist in the gas phase?

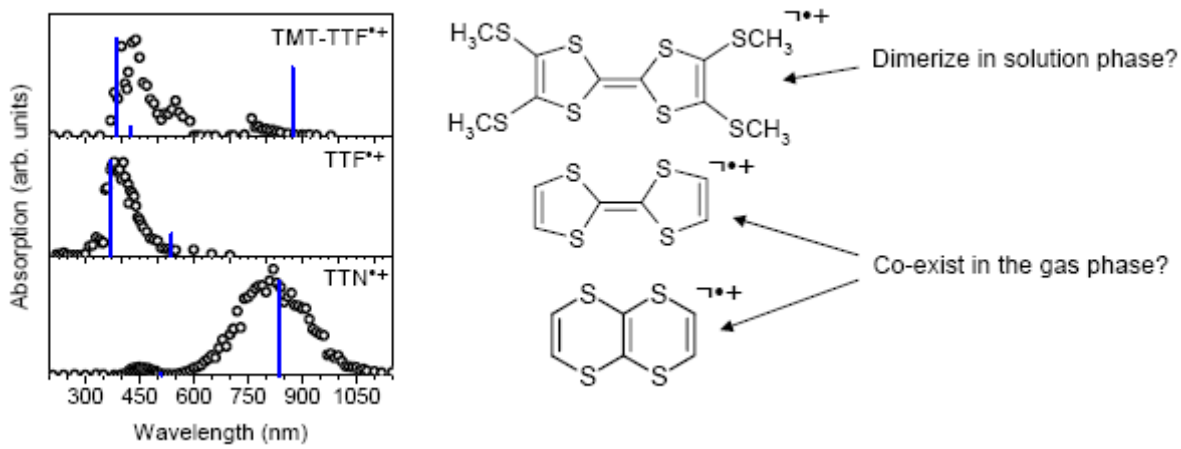

Figure 1. Gas phase absorption spectra of the three radical cations. The blue lines are calculated values.

The gas phase experiments were carried out at the ELectrostatic Ion Storage Ring in Aarhus, ELISA, and include action spectroscopy, mass spectroscopy and lifetime measurements. Combined with solution phase experiments and theoretical calculations, the experiments provide important information on the intrinsic properties of the radical cations and clarify earlier unresolved issues.

References

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