

Switchable phases of metal-organic frameworks DUT-8(Ni): Raman spectroscopy study

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Metal-Organic Frameworks (MOFs) have revolutionized the field of crystal engineering, and solid-state chemistry is unique materials, which can transform their crystal structure from a dense, nonporous to a highly porous, open state and vice versa as a response to external stimuli. They are bistable or multistable crystalline materials with long-range structural ordering, a reversible transformability between crystalline phases, and permanent porosity [1]. MOF exhibit wide variety of properties attractive for a variety of applications.

We report the results of a Raman scattering study of a switchable Metal-Organic Framework DUT-8 (Ni) belonging to the class of pillared layer MOFs [2]. Several samples of DUT-8 series were studied. The Raman spectra comparison showed a significant difference in the low-wavenumber region for open (23 cm⁻¹) and closed (59 cm⁻¹) pore forms of DUT-8(Ni) [3] (Figure 1). This characteristic spectral features can be a basis for rapid, and routinely applicable Raman based technique for characterization of different switchable MOF's phases and for in situ evaluation and analysis of them by the spectral profile.

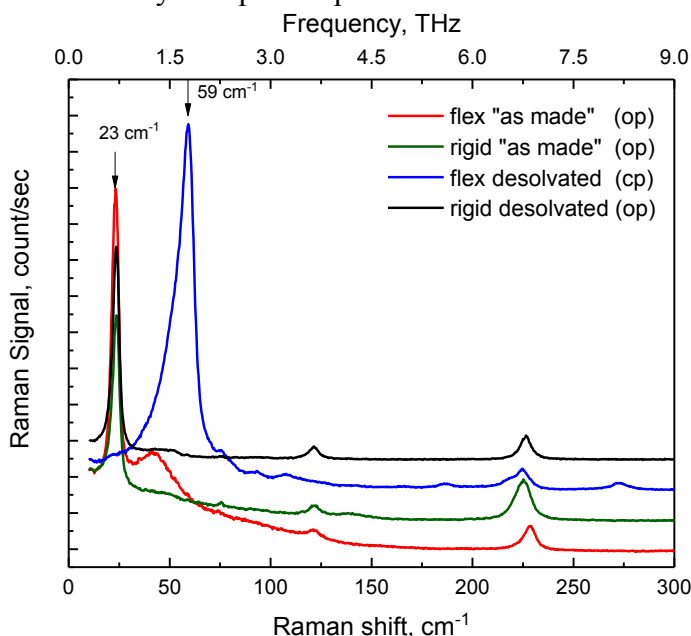


Figure 1. Raman spectra samples of DUT-8(Ni) at open (op) and close (cp) pore form.

Acknowledgments

I.S., V.B., S.K. thank the DFG for financial support (FOR 2433); A.K., S.K., A.V. thank the Russian Foundation for Basic Research for financial support (18-02-00754).

References

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