Coherent anti-Stokes Raman scattering (CARS) technique is based on interference of the scattered light from each molecule of material resulting in the enhancement of the desired signal. The largest enhancement here is expected from highly ordered structures such as a bulk material. This advantage of CARS technique opens a great opportunity for chemical imaging of crystals revealing their crystallinity, orientation of crystalline axis and another structural property. In this work we demonstrate the application of CARS microscopy to study monocrystallinity of micro-nanocrystals such as diamond micro needles, material separation and aggregate formation of the trans-stilbene (TS) and cis-stilbene; TS and hexagonal boron nitride (*h*BN) or graphene and carbon nanotubes.

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