Supporting Information

Bright-field electron tomography of inorganic fullerene-like structures

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Keywords: Transmission electron microscopy, Fullerenes, Layered materials, Nanoparticles, Structural properties of materials, Nanoscale imaging

1. *Tomographic reconstruction of inorganic WS_2 nanotubes*

Two movie clips are included in order to visualize the reconstruction and three-dimensional strcture of bundled nanotubes. Movie S1 shows the aligned tilt series of a bundle of WS_2 nanotubes. Fiducial-less alignment with high accuracy was achieved by the iterated alignment of the tilt series images with respect to the re-projected images calculated from the tomogram. Movie S2 scrolls through slices of the tomogram of the bundle of WS_2 nanotubes, showing the cross section of each tube individually. Shell numbers and residual oxide filling are visible.

Movie S1: Bundle of WS_2 –INT: Aligned tilt series.

Movie S2: Bundle of WS_2 –INT: Animated scroll through slices of the tomogram.

2. *Tomographic reconstruction of IF-MoS_2 agglomerate*

Fig. S1 presents an example for the benefit of the tomographic reconstruction for understanding of the core structure and the arrangement of layer planes throughout a fullerenic structure. The figure shows snapshots of the tomographic recording and reconstruction of agglomerated IF-MoS_2. In Fig. S1a, a single image from the tilt series exemplifies the superposition of information from multiple structures one on top of the other, typical for the conventional two-dimensional image. Using the full tilt series, a 3D reconstruction of the agglomerate volume was carried out, visualized in Fig. S1b. From the reconstructed 3D volume, one particle circled in red was carved out. Its corresponding tomogram slice is seen in Fig. S1c. The volume rendering is presented in Fig. S1d. The movie clip S3 presents an animated voxel view of the tomogram volume, movie clip S4 an animated scroll through tomogram slices, and movie clip S5 an animated voxel view of the 3D volume of a single particle out of the agglomerate.

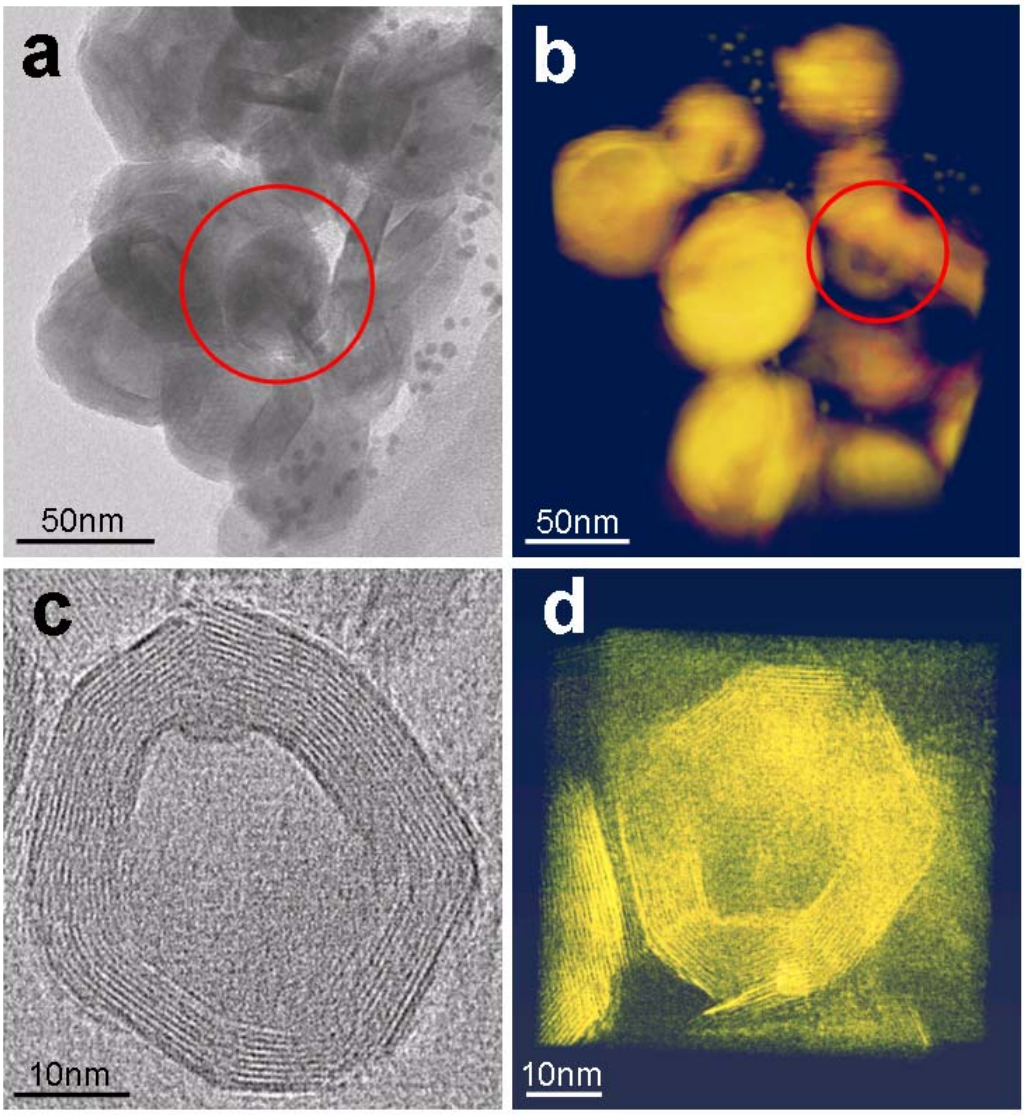

Figure S1. Single axis tomographic reconstruction of IF-MoS_2 agglomerate. An image from the tilt series, around zero tilt, is presented in (a). The voxel view, representing the 3D data, is shown in (b). A corresponding slice of the reconstruction, showing the highlighted particle, is presented in (c). The voxel view, representing the 3D data of the single particle, is shown in (d). The gold particles seen in the surrounding of the particle were added to the sample as markers for alignment (fiducials). Sample courtesy of Dr. L. F. Deepak.

Movie S3: IF-MoS_2 agglomerate – full volume voxel view.
Movie S4: IF-MoS_2 agglomerate – full volume scroll through the tomogram slices.
Movie S5: IF-MoS_2 agglomerate – single particle voxel view.

3. *Dual axis tomographic reconstruction of a single IF-WS_2 particle*

Fig. S2 displays additional views of the dual axis tomogram taken from an IF-WS_2 particle. The figure shows slices of the tomogram in three orthogonal viewing directions. Size, shape and layer structure are visible in all three directions because of the reduced missing wedge

owing to the dual axis recording. The movie clip S6 presents a rendered voxel view of the particle volume.

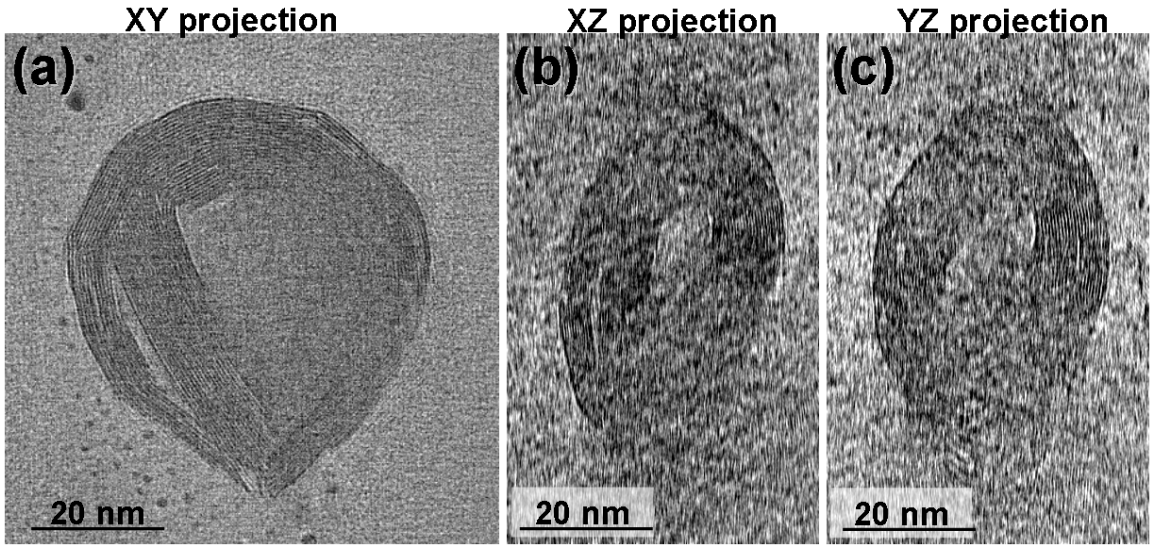

Figure S2. Dual axis tomographic reconstruction of a single IF-WS_2 particle. A reconstruction slice of an XY view, already shown as Fig. 3b (a), XZ view (b) and YZ view (c).

Movie S6: IF-WS_2 single particle - voxel view.