**Descrizione Graphical Abstract**

This graphical abstract is a composite figure which combines:

1. The picture of the JEOL JEM-ARM200F, in the round image on the right side of the figure.
2. The atomic resolution HAADF-STEM image of the grain boundary termination in 3C-SiC film, in the center (yellow contour).
3. The image of a core/shell Si/SiO2 nanowire, at the bottom left side of the figure (violet contour); this image is obtained via superposition of the EFTEM images acquired at the plasmon energy loss of Si (17 eV, in magenta) and SiO2 (23 eV, in purple).
4. The atomic resolution HAADF-STEM image of a CuO nanocrystal, on the left side of the figure (green contour).
5. The crystallographic (upper image) and chemical maps (images below) of a Ge-rich chalcogenide film, on the top left side of the figure (cyan contour).