Neutrophilic iron oxidizing bacteria extract metabolic energy from iron oxidation in various environments, such as groundwater seeps, streams, wetlands, the rhizosphere, and hydrothermal vents. Their physiology is not well understood, and in particular the role of extracellular polymers in iron oxide mineralization and possibly energy metabolism. Recent experiments with the Spectromicroscope for PHotoelectron Imaging of Nanostructure with X-rays (SPHINX) on precipitated Fe oxides in biofilms clarified that microbially extruded polysaccharide filaments provide the precipitation substrate for amorphous FeOOH. Upon aging the mineralized filaments crystallize to ferrihydrite (2-line FeOOH), with one curved pseudo-single crystal of akaganeite ($\beta$-FeOOH), at the core of each filament, of aspect ratio 1:1000:1. Structure and morphology of this unusual and unprecedented nanoscale crystal is therefore templated by polysaccharides. After formation of the crystal fiber, the polysaccharide structure is also altered, and C1s spectra suggest that the COO$^-$ group is involved in the templation mechanism.