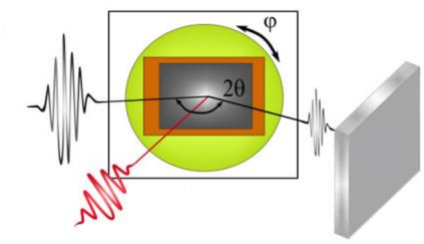
SLS: A MODERN LOOK AT A MEDIEVAL BILAYER METAL LEAF: NANOTOMOGRAPHY OF ZWISCHGOLD

To gild sculptures in the late Middle Ages, artists often applied ultra-thin gold foil supported by a silver base layer. Scientists at PSI have now succeeded in producing for the first time nanoscale 3D images of this material, known as Zwischgold. The samples were unusual even for the highly experienced PSI team: minute amounts of material taken from three modern and four medieval samples, including an altar and wooden statues originating from the fifteenth century. Preforming ptychographic X-ray computed tomography (PXCT) at SLS, the team looked at the leaf structure and chemical state of the material. The measurements underline how highly sophisticated the mediaeval production technique for Zwischgold was, but also revealed increasing porosity of the leaf materials and their corrosion products, as well as delamination of the leaves from their substrate — issues typically observed in the conservation of such artefacts.

Read more: *https://www.psi.ch/en/media/our-research/nanomaterial-from-the-middle-ages*

Q. Wu et al.*, Nanoscale* ***14****, 15165 (2022)*
DOI: 10.1039/d2nr03367d

SWISSFEL — STRONG MODULATION OF CARRIER EFFECTIVE MASS IN WTe_2 VIA COHERENT LATTICE MANIPULATION



The layered transition-metal dichalcogenide WTe2 is characterized by distinctive transport and topological properties. These emergent electronic properties can in principle be manipulated by changes in the crystal structure. However, how precisely a given structural change alters the electronic properties is typically difficult to determine, as direct structural probes with high time resolution are required. A team of researchers working at the Bernina beamline of SwissFEL has now followed the structural dynamics in WTe2 after excitation with femtosecond laser pulses, with particular focus on coherent phonon modes. Their time-resolved X-ray diffraction results, supported by infrared reflectivity measurements, suggest that phonons might periodically modulate the effective mass of carriers in the electron and hole pockets by up to 20% — indicating a route to controlling the peculiar transport properties of WTe2 on short time scales.

D. Soranzio et al.*, npj 2D Materials and Applications 6, 71 (2022)*
DOI: 10.1038/s41699-022-00347-z

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