The tensile behavior of a Ti–11%Zr–14%Nb–10%Sn alloy with pure orthorhombic α” phase was studied by in situ X-ray diffraction using synchrotron radiation. It is found that no phase transformation happens during the whole tensile process. The “double-yielding” platforms of this alloy are indeed due to a low stress yielding (~400MPa) followed with a significant work-hardening before necking and fracture. In this process, the [0 2 2] orientation of grains more approaches the tensile direction and the [2 0 0] moves to the transverse, causing the lattice parameter a to be shrunk, and b and c elongated, and the formation of texture. The similar texture can also be produced upon cold rolling by which the yield strength of the α” phase is largely improved to be over 900 MPa.

References