# Fine tuning of titanate nanostructures' surface acidic sites

D. Madarász, I. Szenti, A Sápi, Á. Kukovecz, Z. Kónya

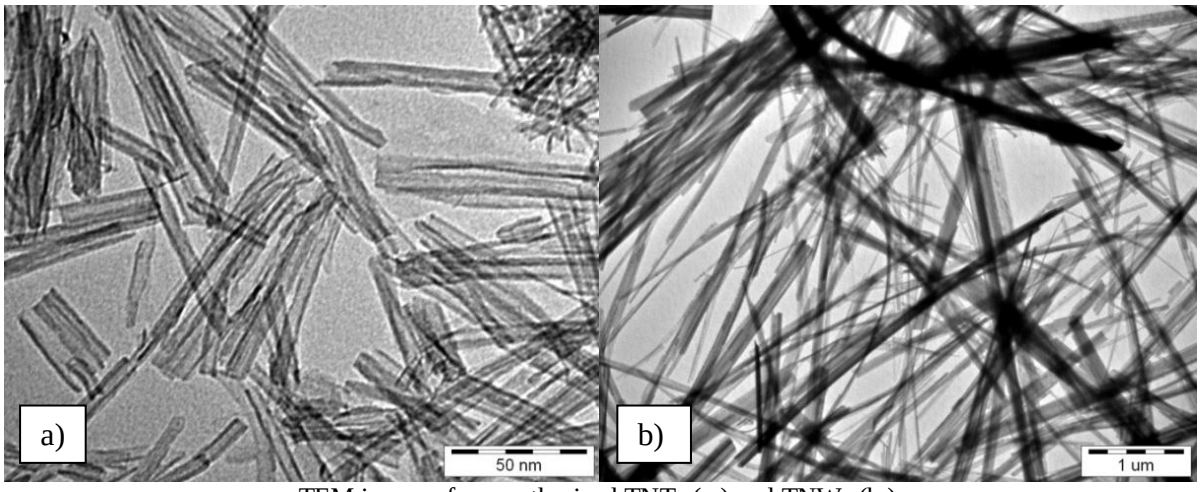
*Department of Applied and Environmental Chemistry, H-6720 Szeged, Rerrich B. tér 1.*

One-dimensional trititanate nanostructures, like nanotubes (TNT) and nanowires (TNW) have attracted great attention of scientific researches due to promising chemical and mechanical properties.

Their microstructure and negatively charged skeleton exhibit cation-exchange properties. With acidic post treatment of the pristine TNTs and TNWs sodium ions can be changed to protons or other cations. This process can be finely controlled.

Due to the great variety of ion-exchange and the usage of support, TNTs and TNWs can be applied in heterogeneous catalytic reactions. We expected that by the variation of Na+/H+ ratio we can modify the amount and ratio of Lewis and Broensted acidic sites, which is very important in heterogeneous catalytic reactions on solid acids.

The morphology of the as-synthesized nanostructures was observed by TEM, SEM measurements. We followed the Na+/H+ ratio in partially protonated TNTs and TNWs with EDS analysis. The crystallographical changes were observed with HRTEM measurements, X-ray, and electron diffractometry. The changes in the ratio of Lewis and Broensted acidic sites was measured by temperature programmed desorption technique. The specific surface area was determined from $N_2$ adsorption isotherms.




TEM image of as-synthesized TNTs (a.) and TNWs (b.).