V-W-TiO₂ catalysts are prepared as nanofibers for the removal of the NOx in exhausts via the NH₃ Selective Catalytic Reduction (SCR) method. By combining electrospinning and soft chemistry, materials are processed as nanofibers with the catalytic components (e.g., V₂O₅-WO₃) incorporated as dopants into the supporting anatase phase (e.g., TiO₂). The conditions for the chemical synthesis were investigated by varying the molar ratios between titanium alkoxide (tetraisopropoxide) and the chelating agent (acetic acid). Catalytic characterization clearly shows an impact of the starting precursor coordination on the final nanostructure, and thus on the catalytic performances. Superior NOx conversion are obtained for nanofibers formed by high coordination level, i.e., [Acetic acid]/[Ti cation]>2, with high stability and control over the processing route.