We report on spectroscopic investigations on In$_2$O$_3$ single crystals. We focus on the detailed analysis of the O1s resonance profile by resonant photoelectron spectroscopy (resPES). From these we analyze the electronic structure and assign the O2p- and In5sp-state to build the valence band and the conduction band in different contributions, respectively. This is deduced from constant final state spectra on the O-KLL-Auger along the O K-edge and In M$_{4,5}$-edge and a comparison to the corresponding X-ray absorption spectroscopy data. We also identify several types of defects. A broad band of oxygen derived defects is identified in the valence band and extends throughout the gap. Small polarons are attributed to cause an anti-resonance in the constant initial states around the O1s threshold. In addition, an Auger decay separated by the O-KLL is present at O-K resonance and indicates the existence of localized charge transfer states which involves In5sp states. Finally, we are able to distinguish two different oxygen species from the resPES data. One corresponds to the intrinsic In$_2$O$_3$ structure and the other is a non-corresponding species.