Figure S1: *Nyquist plot obtained from EIS analysis at open circuit potential of the WO₃, 5Pt_WO₃, the 10Pt_WO₃ and the 20Pt_WO₃ electrodes (red, blue, yellow, and green circles, respectively. Inset: magnification of the high frequency region.*
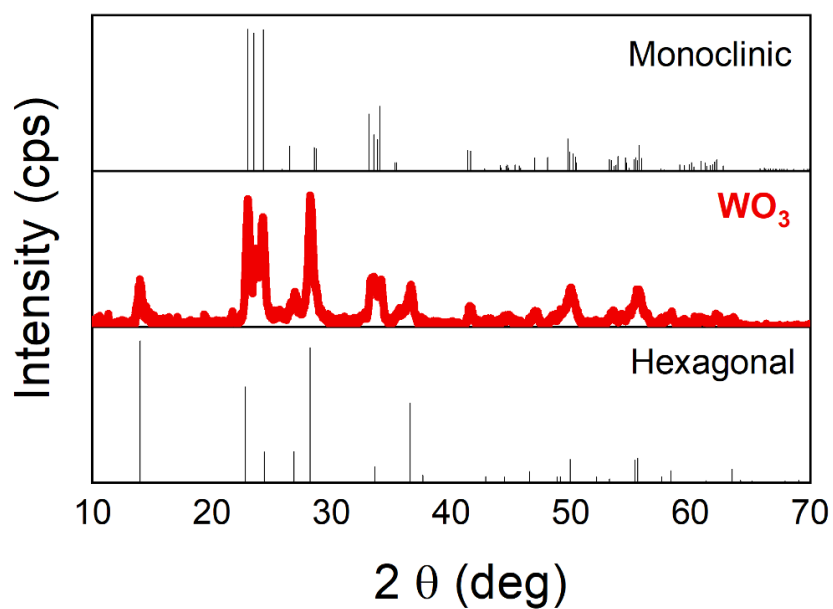

Figure S2: *XRD pattern of the WO₃ nanorods (red line) compared with the characteristic patterns of hexagonal and monoclinic WO₃: Both hexagonal (2Θ = 14°, 24.37°, 26.85°, 28.22°, 33.61°, 36.57°, and 49.95°) and monoclinic (2Θ= 23°, 23.50°, 24.28°, 33.12°, 33.54°, 33.83°, 34.04°, 49.74°, 55.71°) characteristic peaks appear, thus confirming the formation of stable phase junctions.*
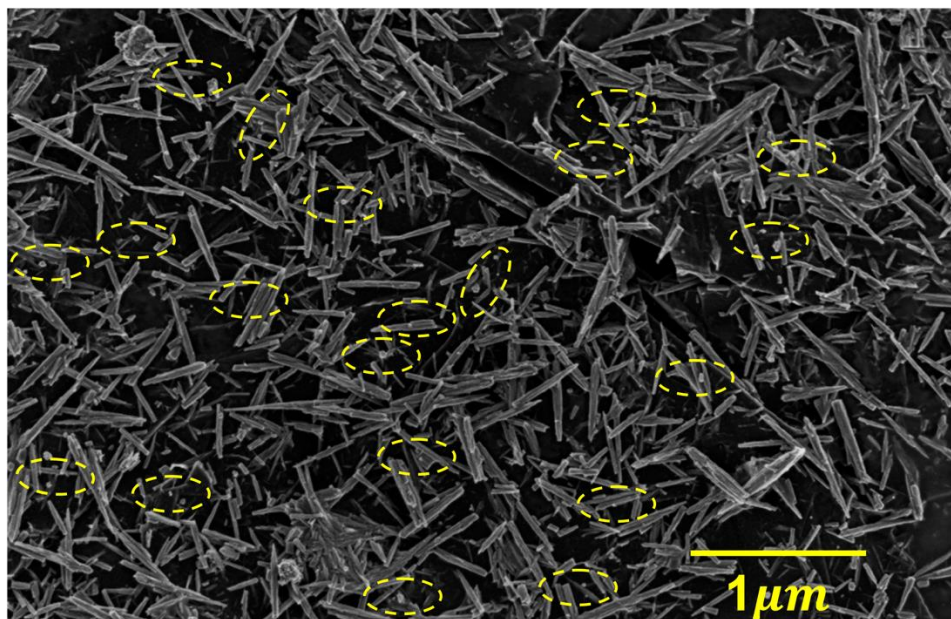
Figure S3: *Low magnification SEM image of the 10Pt_WO₃ electrode in which the most visible Pt nanoparticles are highlighted in yellow.*

RIR methods

The RIR method is used for the calculation of phase composition in a hybrid phase structure, in terms of weight ratio (w%) starting from the intensities of the strongest line of the X-ray diffraction patterns (*I*) as follows [1-2]:

$$W_h = \frac{I_h}{I_h + (I_m/(RIR_m/RIR_h))} \tag{S4}$$

$$W_m = \frac{I_m}{I_m + (I_h/(RIR_h/RIR_m))} = 1 - W_a \tag{S5}$$

where *h* and *m* denote the different coexistent hexagonal and monoclinic crystal phases respectively and the *RIR* values depend on the analyzed crystal phases. The RIR values for the *h*- and *m*-WO₃ are 8.33 (PDF #89-4476) and 5.58 (PDF #75-2187). The monoclinic (hexagonal) weight ratio in the WO₃ based nanorods is 56 % (44 %), thus confirming the phase heterogeneity of WO₃ nanorods and the presence of hexagonal and monoclinic crystallites in contact each other to form phase junctions [3].

References

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