

Rational Design of hierarchical hollow spherical $W_{18}O_{49}$ with abundant oxygen vacancies through Mo doping for efficient TEA gas sensing

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3. Results and discussion

3.1. Morphology and Structural Characteristics

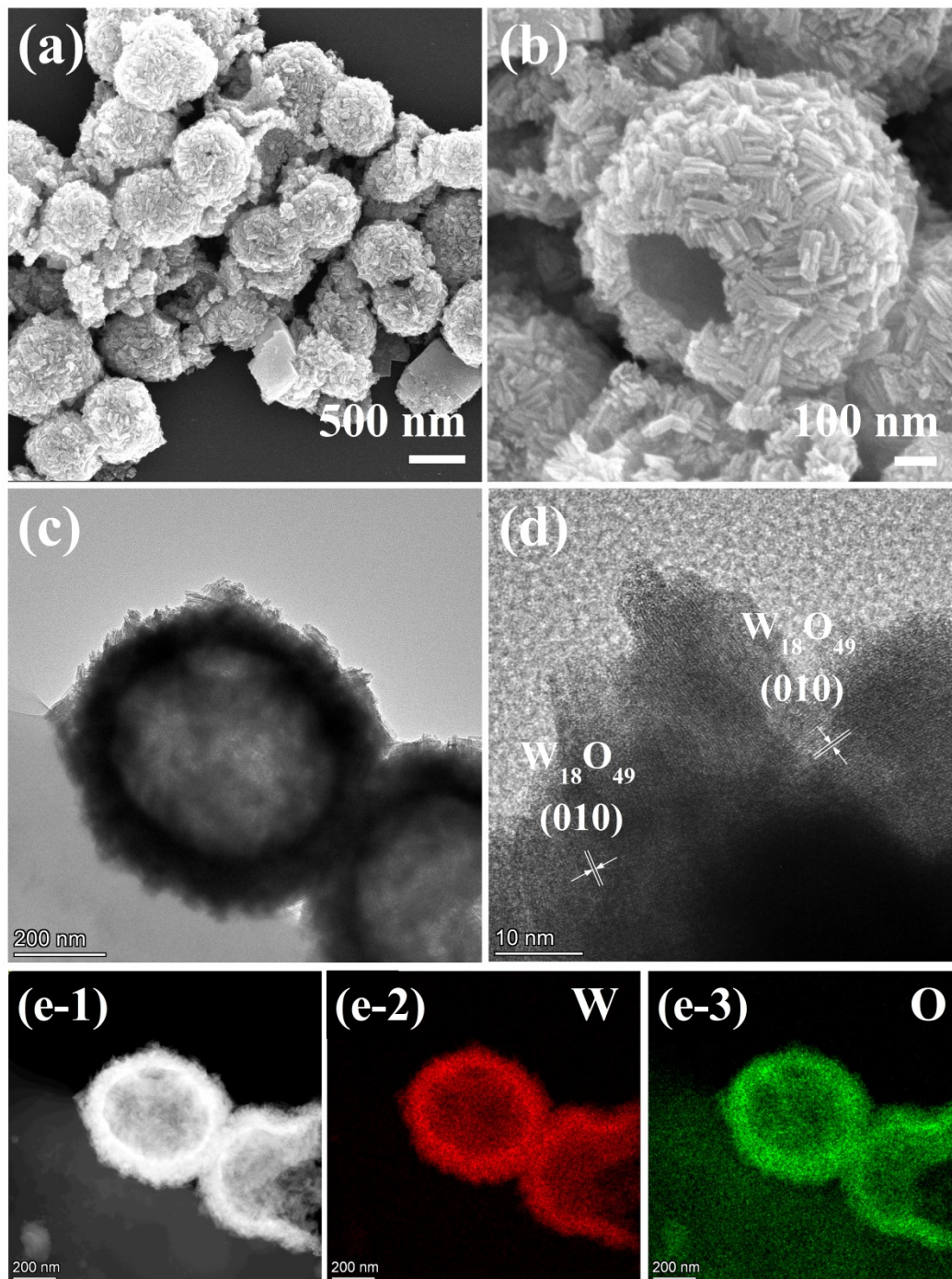


Fig. S1 (a, b) FESEM images of $W_{18}O_{49}(0\% \text{ Mo})$; (c, d) TEM image and HRTEM images of the $W_{18}O_{49}(0\% \text{ Mo})$; (e1-3) STEM image and the corresponding elemental mapping images of W and O element.

Table S1 The results of XPS semi-quantitative analysis of W 4f.

Sample		W^{6+}		W^{5+}		W^{4+}	
$W_{18}O_{49}(0\% \text{ Mo})$	BE	38.31	36.12	37.81	35.7	36.65	35.28
	percentage	45.53%		40.69%		13.78%	
$W_{18}O_{49}(4\% \text{ Mo})$	BE	37.91	35.70	37.42	35.32	36.11	34.94
	percentage	42.32%		42.71%		14.97%	

Table S2 The results of XPS semi-quantitative analysis of O 1s.

Sample		O_L	O_V	O_C
$W_{18}O_{49}(0\% \text{ Mo})$	BE	530.40	530.99	531.84
	percentage	51.75	37.423	10.83
$W_{18}O_{49}(4\% \text{ Mo})$	BE	529.92	530.52	531.81
	percentage	45.15	40.91	13.94

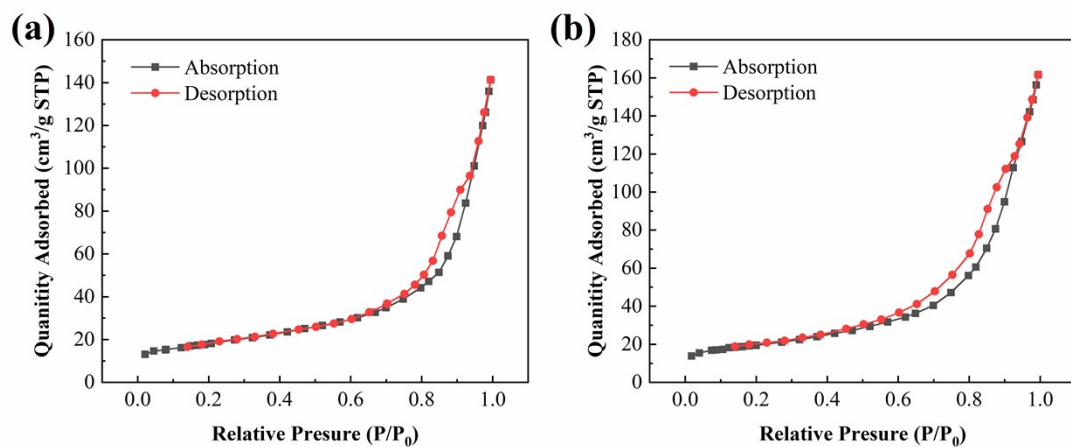


Fig. S2 Nitrogen adsorption-desorption isotherms of (a) $W_{18}O_{49}(0\% \text{ Mo})$; (b) $W_{18}O_{49}(4\% \text{ Mo})$.

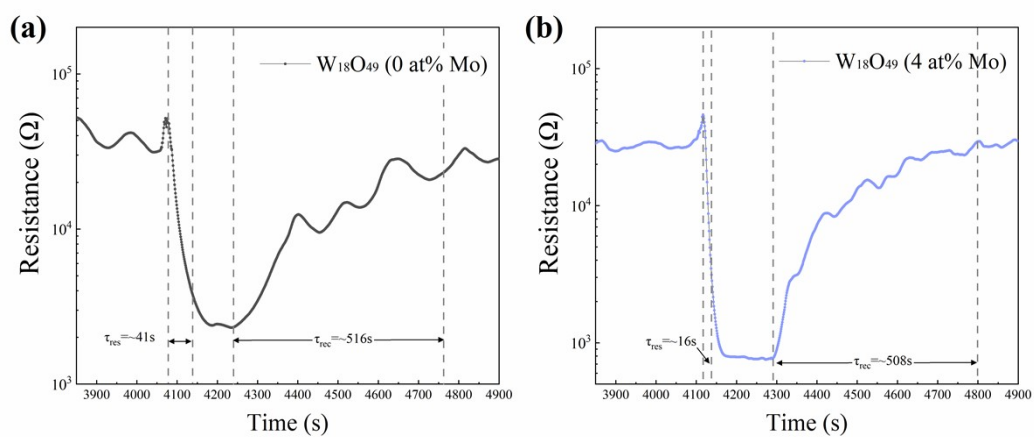


Fig. S3 The response time and recovery time of sensors based on $W_{18}O_{49}(0 \text{ at}\% \text{ Mo})$ and $W_{18}O_{49}(4 \text{ at}\% \text{ Mo})$ samples to 50 ppm TEA.