

# Phosphorus-doped Carbon Supports Enhance Gold-based Catalysts for Acetylene Hydrochlorination

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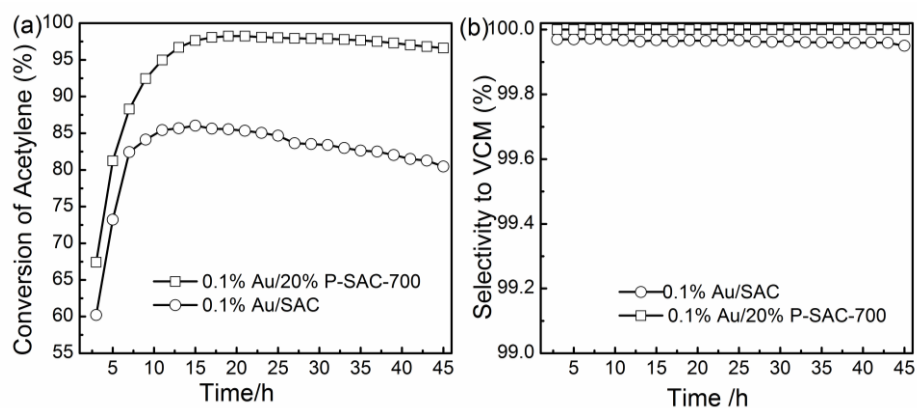


Figure S1 Catalytic performance of catalysts. The acetylene conversion(a) and the selectivity to VCM(b). Reaction conditions: Temperature ( $T$ ) =170°C,  $C_2H_2$  (GHSV) =180  $h^{-1}$ ,  $V_{HCl}:V_{C_2H_2}=1.1:1$ .

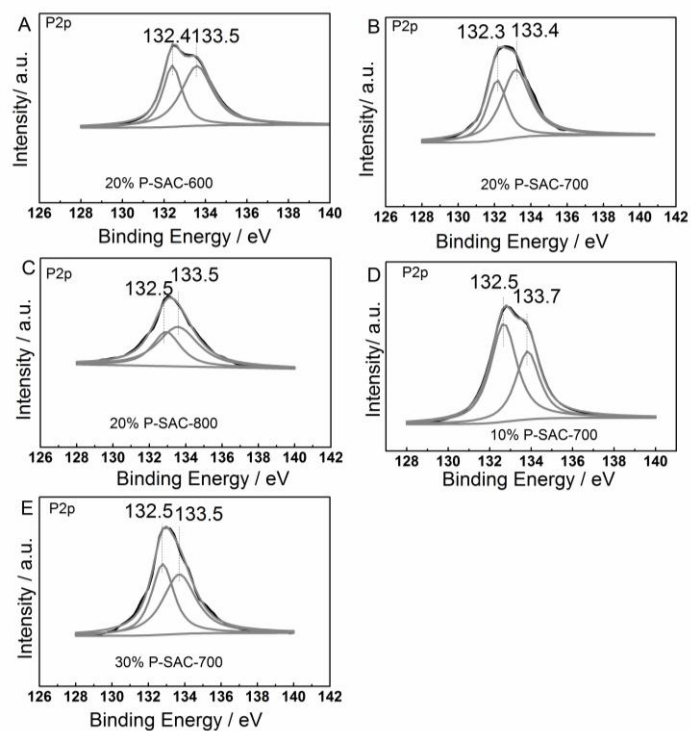


Figure S2 Deconvolution XPS P2p profiles of P-doped SAC.

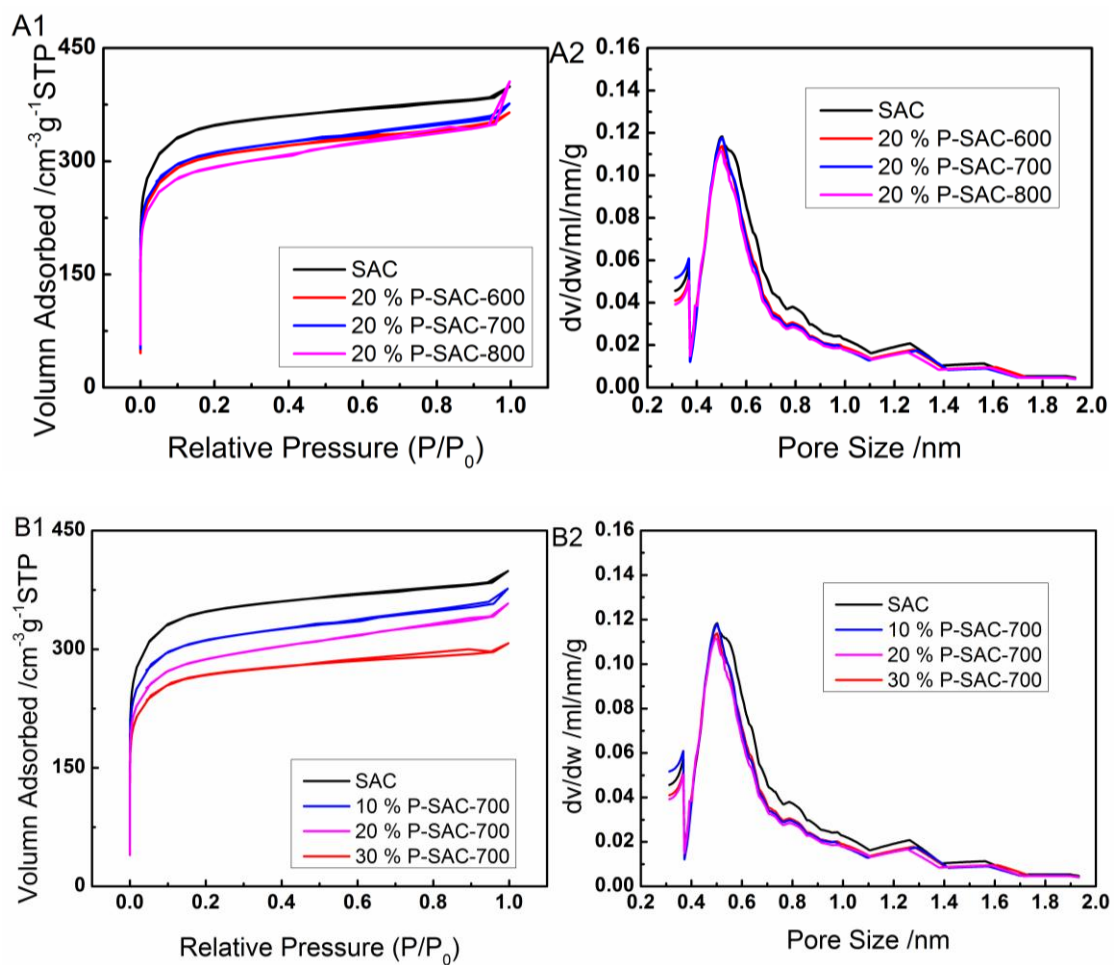


Figure S3 N<sub>2</sub> adsorption and desorption isotherms (A1, B1) of P-doped support and the corresponding pore size distributions (A2, B2).

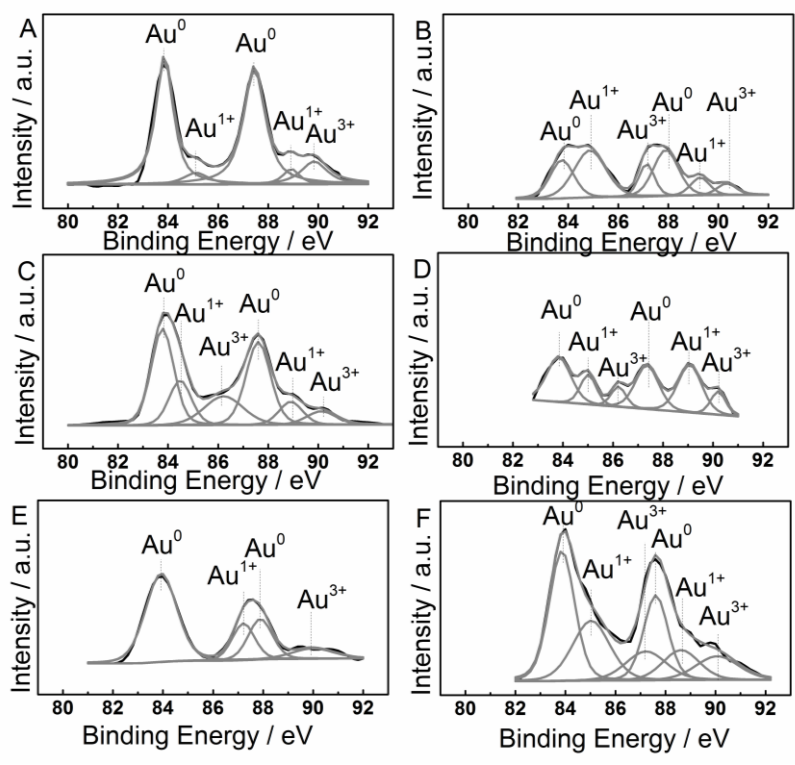


Figure S4 The deconvolution of XPS Au4f profiles for the catalysts

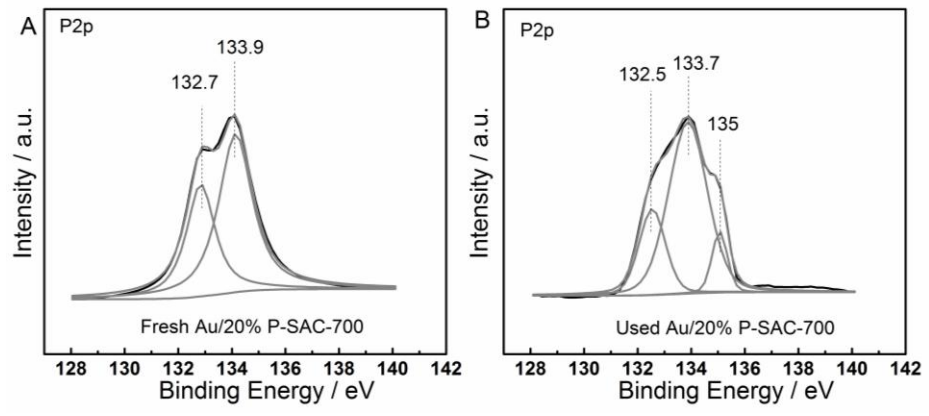


Figure S5 Deconvolution XPS P2p profiles of the fresh (A) and used (B) catalyst Au/20%P-SAC-700.

Table S1 Weight loss of catalysts at different temperature region.

Catalysts	Temperature range ( °C)			
	<150	150-350	350-500	150-500
Fresh Au/SAC	1.2	1.38	2.37	3.75
Used Au/SAC	4.87	3.57	5.56	9.13
Fresh Au/20 % P-SAC-700	3.63	3.59	3.47	7.06
Used Au/20 % P-SAC-700	7.13	3.04	5.33	8.37