Effect of phosphorus on tribological properties of laser clad AlCoCrFeNiTi high-entropy alloy coating in 3.5% NaCl solution

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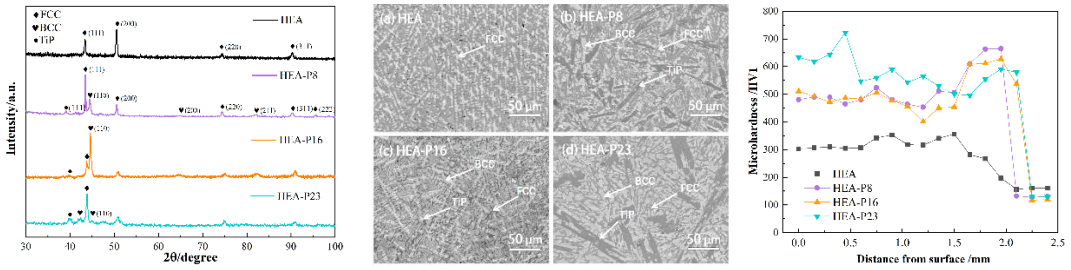

Fig. 1 XRD diffraction patterns of HEA coatings with different P contents. **Fig. 2** Cross-sections SEM photographs of HEA coatings with different P contents. (a) HEA, (b) HEA-P8, (c) HEA-P16, and (d) HEA-P23. **Fig. 3** Cross-section microhardness of laser clad HEA-P*x* coatings.

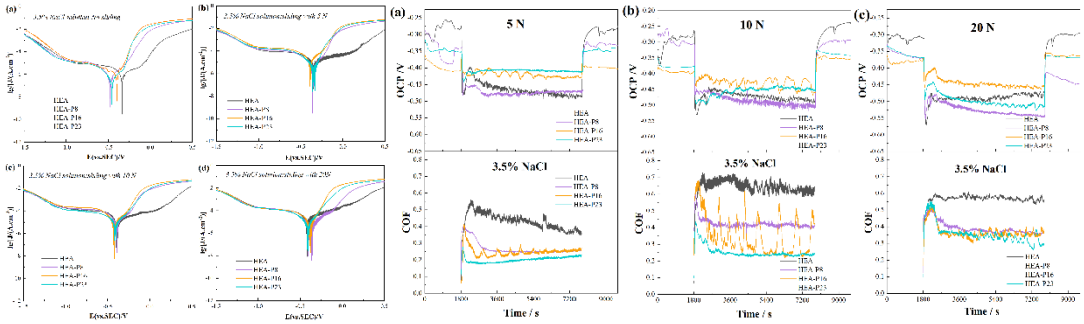

Fig. 4 Kinetic potential polarization curves of HEA coatings with different P contents in 3.5% NaCl solution: (a) no sliding; (b) sliding at 5 N load; (c) sliding at 10N load; (b) sliding at 20N load. **Fig. 5** COFs and OCPs of HEA-P*x* coatings when sliding against Si_3N_4 ball in 3.5% NaCl solution under (a) 5N, (b) 10N, and (c) 20N, respectively.

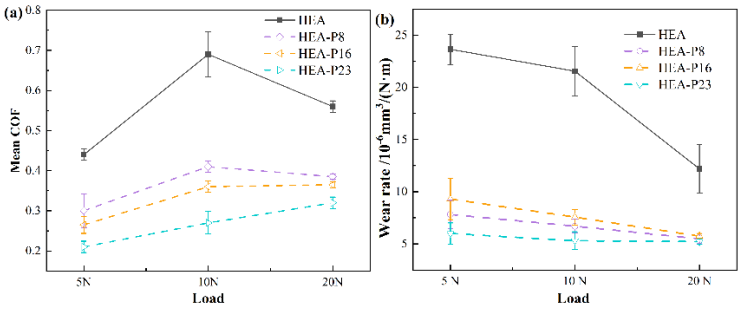

Fig. 6 Average coefficient of friction (a) and wear rate (b) of HEA-P*x* coatings when sliding in 3.5% NaCl solution against Si_3N_4 ball at different loads.

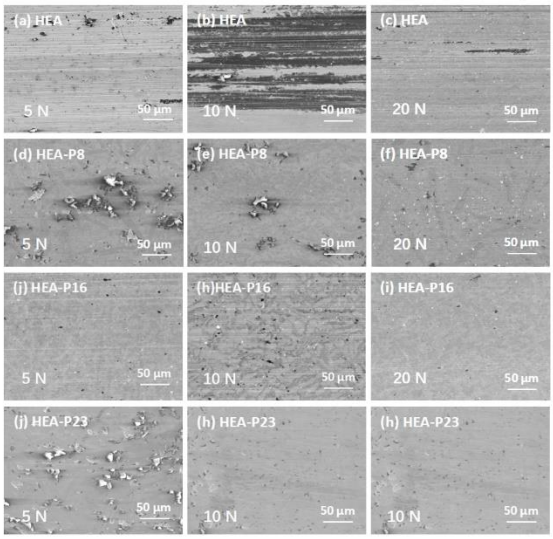

Fig. 7 Worn morphologies of HEA coatings after sliding in 3.5% NaCl solution against Si_3N_4 ball under different loads. (a) HEA under 5N, (b) HEA under 10N, (c) HEA under 20N, (d) HEA-P8 under 5N, (e) HEA-P8 under 10N, (f) HEA-P8 under 20N, (g) HEA-P16 under 5N, (h) HEA-P16 under 10N, (i) HEA-P16 under 20N, (j) HEA-P23 under 5N, (k) HEA-P23 under 10N, and (l) HEA-P23 under 20N.

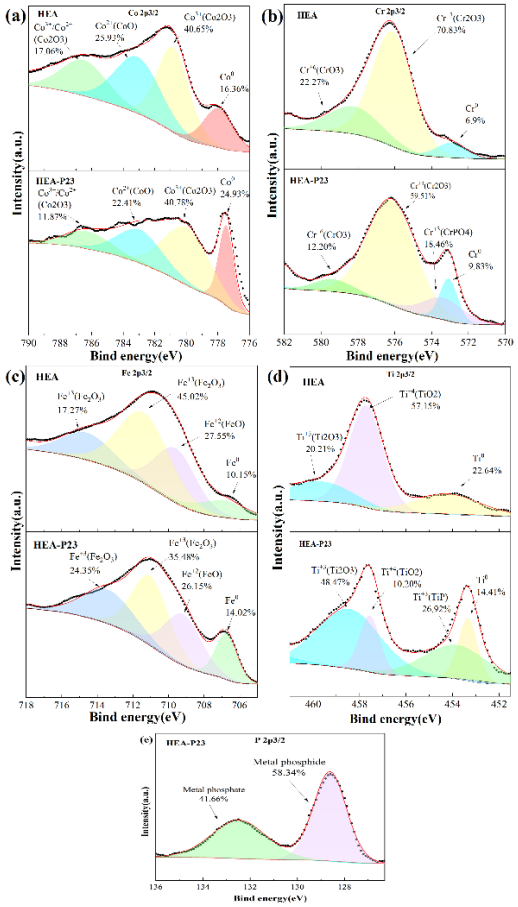

Fig. 8 XPS fine spectra of Co 2p (a), Cr 2p (b), Fe 2p (c), Ti 2p (d) and P2p (e) obtained from the worn surfaces of HEA and HEA-P23 coatings after sliding in 3.5% NaCl solution against Si_3N_4 ball at 10 N.