Abstract

Fe-10%Cr-8%P-2%C(10Cr), Fe-20%Cr-8%P-2%C(20Cr) and Fe-10%Cr-10%Mo-8%P-2%C(10Mo) alloy powders (mass percent) were sprayed by the HVOF process under different conditions. The as-sprayed coatings of 10Mo alloy were composed of only an amorphous phase under all the spray conditions, while the as-sprayed coatings of the 10Cr and 20Cr alloys consisted of an amorphous phase with a small amount of crystalline material. The volume fraction of the crystalline material increased slightly with the rise of the flame temperature. The hardness of the as-sprayed coatings of the 10Cr and 20Cr alloys were 600 to 700 DPN, respectively, while the 10Mo coating composed of an amorphous phase revealed 560 DPN. The corrosion resistance of the as-sprayed coating of the 10Mo alloy was the best among three amorphous coatings and also superior to the nickel base self-fluxing alloy and SUS316L stainless steel coatings in 1*N* H_2SO_4 and 1*N* HCl solutions.