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Photoemission Study of Co-Pt and Co-Pd alloys

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The electronic structures of Co-Pt and Co-Pd alloys have been studied with photoemission spectroscopy using synchrotron radiation to understand the difference and similarity between the two alloy systems. The Co 3d partial spectral weight obtained using Cooper minimum pheonmenon shows that Co 3d states hybridize with Pt 5d stronger than with Pd 4d, which must be responsible for the difference of the magentic properties. The band formation of Co-Pd alloys is largely driven by band repulsion and there is not much overlap between Pd 4d and Co 3d partial spectral weights. However, Co 3d states of Co-Pt alloys have similar structure with Pt 5d in the bonding states. From x-ray photoemission spectroscopy, we also find that band narrowing of Co 3d states in Co-Pd alloys affects the Co 2p core level lineshape, which indicates some electron correlation effect of Co 3d electrons.