The activated carbon from apricot stone with H3PO4 and its ability to remove Co2+ are reported. The FTIR spectroscopy brings insights on interactions between the functional groups of the carbon and Co2+. Adsorption studies are carried in batch mode by varying the initial Co2+ concentration and pH. A comparison of two kinetic models on the overall adsorption rate shows that the system is described by the pseudo-second-order kinetic model. The Freundlich model fits the data with a monolayer adsorption capacity of 111.11 mg/g at pH 9. The enthalpy and free energy indicate an endothermic and not spontaneous process