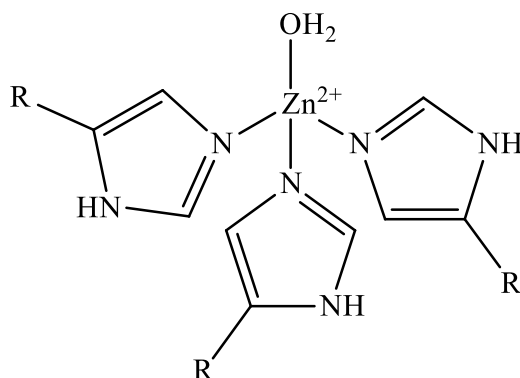


- The structure below represents the active site in carbonic anhydrase, which features a Zn^{2+} ion bonded to three histidine residues and a water molecule.



The $\text{p}K_a$ of uncoordinated water is 15.7 but the $\text{p}K_a$ of the water in carbonic anhydrase is around 7. Suggest an explanation for this large change.

When studying zinc-containing metalloenzymes such as this, chemists often replace Zn^{2+} with Co^{2+} because of their different magnetic properties. Predict which of these species, if either, is attracted by a magnetic field. Explain your reasoning.