Abstract

This work is devoted to the removal of free cyanide from aqueous solution by oxidation with hydrogen peroxide H_2O_2 catalyzed by copper-impregnated activated carbon. Effects of initial molar ratio $[H_2O_2]_0/[CN^-]_0$, copper-impregnated activated carbon amount, pH and the temperature on cyanide removal have been investigated. The presence of copper-impregnated activated carbon has increased the reaction rate showing thus a catalytic activity. The rate of cyanides removal increases with the raise of the initial molar ratio $[H_2O_2]_0/[CN^-]0$ and decreases with the increase in the pH from 8 to 12. The increase in the copper-impregnated activated carbon amount from 1.5 to 10 g/L in reaction solution has a beneficial effect. Beyond this value, the impact of activated carbon amount is not anymore significant. The temperature does not have a significant effect between 20 and 35 °C. The four successive times re-use of catalyst shows a good stability. The kinetics of cyanide removal has been found to be of pseudo-second-order with respect to cyanide and the rate constants have been determined. This process seems very interesting because the rate of cyanides removal is very fast, the reaction does not use soluble metal catalyst and it consumes only hydrogen peroxide as chemical product