## Bentonite modified with ions of transition metals in the reaction of ozone decomposition

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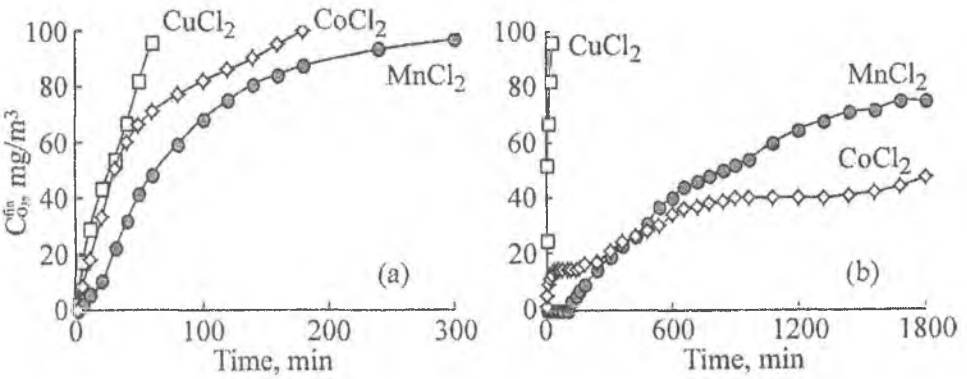
Since the catalysts required for ozone decomposition in individual and collective protective devices must be in a suitable solid form, their active components are usually anchored on different supports. As such supports, natural aluminosilicates are of special interest due to their availability and cheapness. In the work, there are presented some results concerning the activity of $MCl_2$/N-Bent catalysts (M = $Cu^{2+}$, $Co^{2+}$, and $Mn^{2+}$; N-Bent – natural bentonite) in the reaction of low-temperature ozone decomposition. The physicochemical properties of N-Bent and the $MCl_2$/N-Bent catalysts were studied by X-ray phase analysis and IR spectroscopy which showed that the catalyst formation on the surface of natural bentonite was accompanied by neither substantial structural changes nor new phase formation. Testing catalytic properties of the N-Bent and $MCl_2$/N-Bent samples in the reaction of ozone decomposition, we have found that natural bentonite is inactive in the reaction. The Figure shows the time dependence of the final ozone concentration ($C_{O_3}^{fin}$) in the course of ozone decomposition over the $MCl_2$/N-Bent catalysts at two different $MCl_2$ concentrations: (a), $1.2 \cdot 10^{-6}$ mol/g; and (b), $2.4 \cdot 10^{-4}$ mol/g; and the initial ozone concentration 100 mg/m$^3$.




As can be seen, $CuCl_2$/N-Bent has the lowest activity, which is explained by the thermodynamic limitation of copper(II) oxidation by ozone. The Mn(II) and Co(II) containing catalysts show the similar activity, however $MnCl_2$/N-Bent is more effective during a starting period of the process: $C_{O_3}^{fin} = 0$ over the periods of time of 3 and 100 min at $MCl_2$ concentrations of $1.2 \cdot 10^{-6}$ and $2.4 \cdot 10^{-4}$ mol/g, respectively. Taking into account kinetic and stoichiometric parameters of the reaction, the order of the catalytic activity for the $MCl_2$/N-Bent catalysts is $CuCl_2$/N-Bent < $CoCl_2$/N-Bent < $MnCl_2$/N-Bent.