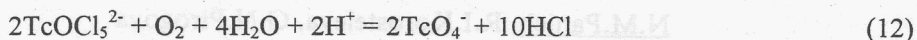


noted that hydrogen peroxide interacts with Tc(V) almost instantly (at 25°C, [HCl] = 2 mole/l and [H<sub>2</sub>O<sub>2</sub>] = 1·10<sup>-3</sup> mole/l).

The oxidation of Tc(V) with oxygen of the air



proceeds rather slowly. Upon holding the solution in an open optical cell without purging with air this reaction proceeds by the first order reaction at the rate constant  $k_1' = 9.6 \cdot 10^{-2} \text{ min}^{-1}$  at 40°C and [HCl] = 1 mole/l. After it is completed to 70% the reaction is decelerated and further on its course also follows the first order equation at the rate constant  $k_2' = 1.4 \cdot 10^{-2} \text{ min}^{-1}$  under the same conditions. The slow reaction stage is likely to be limited by the oxygen diffusion through the surface of the reaction solution.

Tetravalent technetium (as  $\text{TcCl}_6^{2-}$  ion) that is most stable in a HCl solution is rather easily oxidizable in the absence of Cl<sup>-</sup> ions. Namely, in a HClO<sub>4</sub> solution the rate of the Tc(IV) → Tc(VII) oxidation obeys the equation:

$$d[\text{Tc(VII)}] / dt = k[\text{Tc(IV)}][\text{HClO}_4] \quad (13)$$

where  $k = 1.4 \cdot 10^{-3}$  and  $9 \cdot 10^{-3} \text{ l/mole-min}$  at 25°C and 65°C respectively (variable ionic strength). Compared to perchloric acid the oxidation of Tc(IV) with nitric acid proceeds at the rate two orders higher [10].

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