

1991

**Stability of Pentavalent Plutonium.
Spectrophotometric study of
PuO₂⁺ and Pu⁴⁺ disproportionations in perchloric media.**

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The disproportionation constant of pentavalent plutonium into hexavalent and trivalent forms are determined at $-\lg[H^+] = 1$, in perchloric media of varying ionic strength from 0.1 M to 3 M. These data are extrapolated to zero ionic strength using the Specific Interaction Theory in order to deduce the standard disproportionation constant and the interaction coefficient:

$$\lg K(V)^\circ = 2.6 \pm 0.5$$
$$\Delta\varepsilon = 0.09 \pm 0.1 \text{ (kg/mol)}.$$

$K(V)^\circ$ temperature influence is estimated: PuO₂⁺ is less stable when temperature is increased. The irreversible redox potentials of plutonium are then calculated using PuO₂²⁺/PuO₂⁺ and Pu⁴⁺/Pu³⁺ redox potentials and $K(V)^\circ$. The Pu⁴⁺ formation from PuO₂²⁺ and Pu³⁺ in 1 M HClO₄ solution is also studied.

The results of this experiment and the previous ones are compared: they are consistent. Published work is also discussed.