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THE EXISTENCE OF HEXAHALOTELLURATES IN MORE THAN ONE OXIDATION STATE

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Neutral TeF_6 is the only stable oxidation state VI tellurium hexahalide currently known; similarly $TeCl_6^{2-}$, $TeBr_6^{2-}$ and TeI_6^{2-} are the only examples of oxidation state IV hexahalotellurate species known to date. Recently we have shown with electrochemical reduction of $OTeF_5^-$ that the dual oxidation states VI and IV exist for the oxypentafluorotellurate [1]. Consequently we have studied the hexahalotellurates with electrochemical methods according to the proposed redox scheme:

$$TeX_6 \underset{+\,2e}{\overset{-\,2e}{\rightleftharpoons}} TeX_6^{2-} \underset{+\,2e}{\overset{-\,2e}{\rightleftharpoons}} TeX_6^{4-} \qquad [X = F, Cl, Br, I]$$

For TeF_6 only one process, reduction at - 0.9 V SCE, was observed while $TeCl_6^{2-}$, $TeBr_6^{2-}$ and TeI_6^{2-} can be both reduced and oxidized. Chemical oxidation and reduction in harmony with the electrochemical findings are also described.

1 K. Moock and K. Seppelt, Z. Anorg. Allgem. Chem., 561, 132 (1988).