diketonato)technetium(III) complexes (β-diketone: acetylacetone, benzoylacetone, and 2-thenoyltrifuluoroacetone) were synthesized by the ligand substitution reaction on refluxing $[TcCl(tu)_5]Cl_2$ with the desired β-diketone in mathanol[6].

Kinetic investigations of the ligand substitution reactions of hexakis(thiourea)-technetium(III) with EDTA (ethylenediaminetetraacetic acid) and HEDTA (2-hydroxy-methyl)ethylenediamine-*N,N',N'*-triacetic acid) were also carried out[7]. In the synthesis of Tc(III)-EDTA complex, the substitution reaction proceeds at pH 2 to 4 as

$$[Tc(tu)_6]^{3+} + H_2edta^{2-} \xrightarrow{k_2} ([Tc(tu)_2H_2edta]^{+}) \rightarrow [Tc(tu)(Hedta)]^{0}. \quad (4)$$

The formation rate constant for Eq. (4) was determined to be $k_2 = (3.2 \pm 0.3) \times 10^{-1}$ $M^{-1}s^{-1}$ at 25℃. A similar rate constant was obtained for the substitution reaction of hexakis(thiourea)technetium(III) with HEDTA.

A further study on the rhenium complex is carried out from the view point of utility of hexakis(thiourea)rhenium(III) complex for the synthesis of Re(III)-EDTA complex as a starting compound.

The fundamental immportance of understanding the kinetics and mechanism is now recognized, though studies on the substitution reaction have not yet been caried out sufficiently. In particular, comparison of the kinetics of the substitution reactions of technetium complexes with those rhenium complexes is essental for the determination and evaluation of the fundamental parameters which control the substitution reactions, especially for the syntheses of radiophamaceuticals[8].

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