

## FAST DYNAMIC ELECTRON TRANSFER IN SYSTEMS OF TECHNETIUM ACIDOCOMPLEXES WITH FERRICINIUM CATIONS

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According to the electron structure calculation for Tc-Tc dimer the technetium acidoclusters are characterized by an increased participation of the outer 5s(5p)-AO's in the formation of multiple and delocalized M-M bonds. The possibility of a fast dynamic electron transfer between technetium cluster anions and cations with low-lying diffuse ns(np)-AO's, for instance ferricinium cations, was predicted and found experimentally for the first time in [1]. The temperature dependence of static magnetic susceptibility, conductivity, IR, Mossbauer  $^{57}\text{Fe}$ , ESR, X-ray photoelectron spectra (XPS) were investigated [2]. All the compounds have temperature-independent conductivity and an unusual temperature dependence of the magnetic susceptibility. The effective magnetic moments of all compounds were decreased when temperature was decreased below  $T_k$  ( $\sim 100\text{K}$ ) and  $\text{Fe}^{3+} \rightarrow \text{Fe}^{2+}$  state was observed in Mossbauer spectra. XPS spectra were "disappeared" in the same temperature interval. The ESR spectra show temperature-independent behavior of  $g_{\text{eff}}=2.00$ . The "unusual" behavior of investigated compounds allows us to propose that it is just the case Abrikosov-Sule resonance arise when "dsd" bond fully overlapped with conductivity band and coincides with Fermi level. An experimental study of physical properties allows one to explain the obtained results in approach of the Hubbard model [3] where  $U\mu \rightarrow 0$ . That is the case of conventional RKKI type of interaction when the distance between the localized magnetic moments is large. The formation of the conductivity band is the result of overlapping of 5s (5p) MO of Tc clusters and 4s (4p) MO of ferricinium cations. We assumed that all experimental data confirmed the model proposed.

### References:

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