^{13}C NMR STUDIES OF THE REDOX REACTIONS OF AUTOTHIOMALATE AND BIS(THIOMALATO)GOLD(I) WITH SELENOCYANATE IN AN AQUEOUS SOLUTION

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The interactions of SCN^- with aurothiomalate (AuStm) in aqueous solution were studied by ^{13}C NMR spectroscopy. The AuStm remains polymerized in the presence of SCN^- , however, SeCN^- binds to AuStm forming the NCSe-Au-Stm^- complex. This complex initially disproportionates to give $\text{Au}(\text{SeCN})_2^-$ and $\text{Au}(\text{Stm})_2^-$. The $\text{Au}(\text{SeCN})_2^-$ specie eventually decomposes to give metallic gold and metallic selenium (or selenium anion). The free tmS^- which is released from AuStm with excess SeCN^- is oxidized to thiomalic disulfide (tmS_2). The bis complex $\text{Au}(\text{Stm})_2^-$ was generated in aqueous solution and then reacted with SeCN^- . Since Au(I) is blocked by both sides, SeCN^- did not form tmS-Au-SeCN^- species. Instead, it gave selenium metal and $\text{Au}(\text{CN})_2^-$. In the present studies we have demonstrated that SeCN^- reacts differently with mono- and bis-(thiomalato)gold(I).