Auration of the Sulfones $MeSO_2CH_2CN$ and $CH_2(CH_2SO_2)_2CH_2$

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$MeSO_2CH_2CN$ shows considerable C-H acidity at its methylene group. Through lithiation followed by reaction with $(Ph_3P)AuCl$ it can therefore be readily converted into the dinuclear, geminally substituted product $MeSO_2C[Au(PPh_3)]_2CN$. With an excess of aurating reagents, a third $[(Ph_3P)Au]$ group becomes N-bonded to the nitrile unit to give an ionic trinuclear compound $\{MeSO_2C[Au(PPh_3)]_2CNAu(PPh_3)\}^+BF_4^-$. The same product is obtained by direct reaction of $MeSO_2CH_2CN$ with $[(Ph_3P)Au]BF_4$. The crystal structures of the two products have been determined. The diaurated sulfone parts of the molecule and the cation are virtually superimposible. Small Au-C-Au angles and short Au–Au contacts suggest significant aurophilic interactions ("A-frame" structures). The small -C≡N-Au angle of 165.6(5)° in the cation indicates that the strong $[(Ph_3P)Au]^+$ acceptor causes substantial changes in the bonding of the nitrile group. Dilithiation of 1,3-dithiane-S,S'-tetroxide followed by reaction with 2 equivalents of $(Ph_3P)AuCl$ affords the geminally diaurated compound $CH_2(CH_2SO_2)_2C[Au(PPh_3)]_2$.

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