

INFRARED AND RAMAN STUDY OF NEW TYPES OF ROTATIONAL ISOMERISM IN ORGANOMETALLIC COMPOUNDS OF TRANSITION METALS

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A hindered internal rotation in the molecules of organometallic compounds of transition metals in organic and liquified noble gas solutions was studied using FTIR and Raman spectroscopy in a wide temperature range. It was demonstrated that rotational isomers exist due to the internal rotation about single bonds between the transition metal and carbon atoms (in "staircase" carbonyl pi-complexes of Fe, Mn, Cr, Mo, W), transition metal and non-transition element (in the complexes $\text{Cp}(\text{CO})_2\text{FeM}'\text{X}_2\text{R}$ and $[\text{Cp}(\text{CO})_2\text{Fe}]_2\text{M}'\text{X}_2$, $\text{M}' = \text{Ge, Sn}$, Cp = cyclopentadienyl), and between two transition metals (in binuclear complexes $[\text{Cp}(\text{CO})_2\text{M}]_2$, M = Fe, Ru). The rotation of the $\text{M}(\text{CO})_3$ - fragment was found in the ferrol type clusters of Ru and Re, where this group is pi-coordinated to the double bonds of metallacyclopentadienyl ring. The influence of different factors on the energy difference between rotamers and on the rotational barriers is discussed.