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 Cp(CO)2FeM’X2R and [Cp(CO)2Fe]2M’X2, M’ = Ge, Sn, Cp = cyclopentadienyl), and between two transition metals (in binuclear complexes [Cp(CO)2M]2, M = Fe, Ru). The rotation of the M(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.