

Physical Properties of Selected Metal Carbonyls

Compound	Color	mp. in °C	Symmetry	IR ν_{CO} in cm^{-1}	Miscellaneous
$V(CO)_6$	green-black	70(<i>d</i>)	O_h	1976	paramagnetic, $S = 1/2$
$Cr(CO)_6$	white	130(<i>d</i>)	O_h	2000	$d(Cr - C) = 192$ pm $\Delta_o = 32'200$ cm^{-1}
$Mo(CO)_6$	white	– (subl)	O_h	2004	$d(Mo - C) = 206$ pm $\Delta_o = 32'150$ cm^{-1}
$W(CO)_6$	white	– (subl)	O_h	1998	$d(W - C) = 207$ pm $\Delta_o = 32'200$ cm^{-1}
$Mn_2(CO)_{10}$	yellow	154	D_{4d}	2044(m) 2013(s) 1983(m)	$d(Mn - Mn) = 293$ pm
$Tc_2(CO)_{10}$	white	177	D_{4d}	2065(m) 2017(s) 1984(m)	
$Re_2(CO)_{10}$	white	177	D_{4d}	2070(m) 2014(s) 1976(m)	
$Fe(CO)_5$	yellow	–20	D_{3h}	2034(s) 2013(vs)	bp 103 °C, highly toxic $d(Fe - C_{ax}) = 181$ pm $d(Fe - C_{eq}) = 183$ pm
$Ru(CO)_5$	colorless	–22	D_{3h}	2035(s) 1999(vs)	unstable; forms $Ru_3(CO)_{12}$
$Os(CO)_5$	colorless	–15	D_{3h}	2034(s) 1991(vs)	very unstable; forms $Os_3(CO)_{12}$
$Fe_2(CO)_9$	gold-yellow	<i>d</i>	D_{3h}	2082(m) 2019(2) 1829(s)	$d(Fe - Fe) = 246$ pm
$Co_2(CO)_8$	orange red	51(<i>d</i>)	C_{2v} (solid) D_{3d} (solution)	2112 2107 2071 2069 2059 2042 2044 2031 2031 2023 2001 1991 1886 1857	$d(Co - Co) = 254$ pm
$Ni(CO)_4$	colorless	–25	T_d	2057	bp 34 °C, highly toxic $d(Ni - C) = 184$ pm easily decomposes to Ni and 4 CO