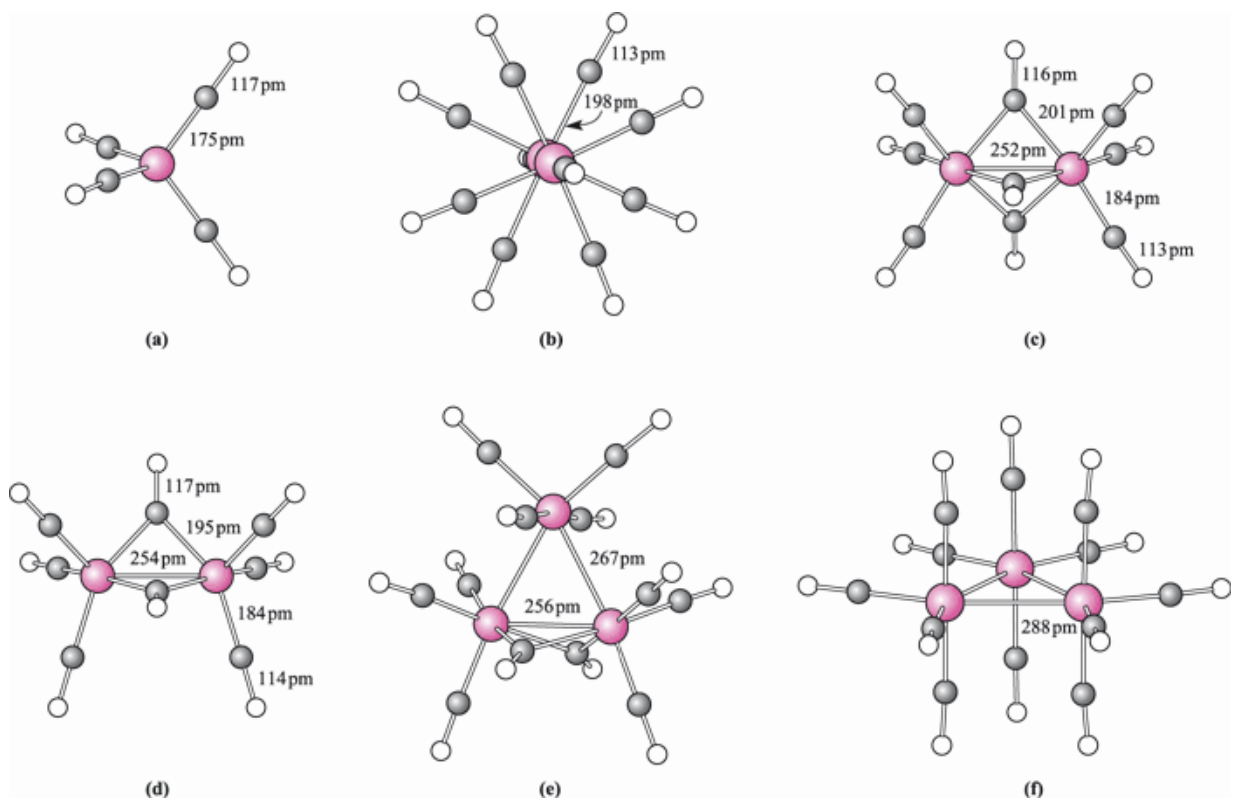


Neutral, low-nuclearity ($\leq M_6$) metal carbonyls of the *d*-block metals (dec. = decomposes)

Group number	5	6	7	8	9	10
First row metals	V(CO)₆ dark-blue solid paramagnetic dec. 343 K	Cr(CO)₆ white solid sublimes dec. 403 K	Mn₂(CO)₁₀ yellow solid mp 427 K	Fe(CO)₅ yellow liquid mp 253 K bp 376 K Fe₂(CO)₉ yellow crystals dec. 373 K Fe₃(CO)₁₂ dark green solid dec. 413 K	Co₂(CO)₈ air-sensitive, orange solid mp 324 K Co₄(CO)₁₂ air-sensitive, black solid Co₆(CO)₁₆ black solid; slowly dec. in air	Ni(CO)₄ colourless, volatile liquid; highly toxic vapour bp 316 K
Second row metals		Mo(CO)₆ white solid sublimes	Tc₂(CO)₁₀ white solid mp 433 K	Ru(CO)₅ colourless liquid mp 251 K dec. in air to Ru ₃ (CO) ₁₂ + 3CO Ru₃(CO)₁₂ orange solid sublimes mp 427 K	Rh₄(CO)₁₂ red solid dec. >403 K to Rh ₆ (CO) ₁₆ Rh₆(CO)₁₆ black solid dec. 573 K	
Third row metals		W(CO)₆ white solid sublimes	Re₂(CO)₁₀ white solid mp 450 K	Os(CO)₅ yellow liquid mp 275 K Os₃(CO)₁₂ yellow solid mp 497 K	Ir₄(CO)₁₂ yellow solid mp 443 K Ir₆(CO)₁₆ red solid	



The structures (X-ray diffraction) of some well-known **metal carbonyl** compounds: (a) $[\text{Fe}(\text{CO})_4]^{2-}$, (b) $\text{Re}_2(\text{CO})_{10}$ (showing staggered configuration), (c) $\text{Fe}_2(\text{CO})_9$, (d) $\text{Co}_2(\text{CO})_8$, (e) $\text{Fe}_3(\text{CO})_{12}$ and (f) $\text{Os}_3(\text{CO})_{12}$.