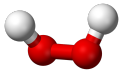
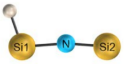
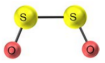
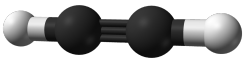
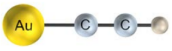
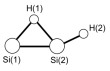
4 atoms

Point group	Graph	Shape	Example	Dihedrals	
T_d	K_4	Regular Pyramidal	P_4	$\cos^{-1}\left(\frac{1}{3}\right)$	
C_{3v}	S_3	Pyramidal	NH_3	$\cos^{-1}\left(\frac{\cos\theta(1-\cos\theta)}{\sin^2\theta}\right)$	
C_s	S_3	Pyramidal	Cl_2OS	$\cos^{-1}\left(\frac{\cos\theta-\cos^2\varphi}{\sin^2\varphi}\right)$	
D_{2h}	$K_4 - e$	Planar	Cl_2Cu_2	0 or 180	
C_{2v}	$K_4 - e$	Pyramidal	H_2Si_2	$\cos^{-1}\left(\frac{\cos\theta-\cos^2\varphi}{\sin^2\varphi}\right)$	
C_2	P_4	Pyramidal	H_2O_2	$\cos^{-1}\left(\frac{\cos\theta-\cos^2\varphi}{\sin^2\varphi}\right)$	
C_1	P_4	Pyramidal	H_2OS	$\cos^{-1}\left(\frac{\cos\theta-\cos\varphi\cos\phi}{\sin\varphi\sin\phi}\right)$	
D_{3h}	S_3	Planar	BH_3	0 or 180	
C_s	P_4	Planar	$HNSi_2$	0 or 180	
D_{2h}	C_4	Planar	Br_2Na_2	0 or 180	
C_{2v}	P_4	Planar	O_2S_2	0 or 180	
C_{2v}	S_3	Planar	CFO_2	0 or 180	
$D_{\infty h}$	P_4	Linear	C_2H_2	0 or 180	
$C_{\infty v}$	P_4	Linear	C_2AuH	0 or 180	
C_s	$T_{3,1}$	Planar	H_2Si_2	0 or 180	
C_s	S_3	Planar	$CBrFO$	0 or 180	
C_{2v}	$K_4 - e$	Planar	C_3Si	0 or 180	
C_{2v}	$K_4 - e$	Planar	C_3Si	0 or 180	

From 2019 add AsP3, from Kuchitsu book add N2H2 it's the only C2h molecule so far.

I have finished *fairly* thorough look through 2019 Vogt, 30A, 30B, 28A, 28C, 28D. Only 28B and 25-series need tobe looked at now.

5 atoms

Point group	Shape	Example	Dihedrals	
T_d		O_4Os	$\cos^{-1}\left(\frac{1}{3}\right)$?	
C_{3v}		ClH_3Si		
C_{3v}		$(Kr)(O_3S)$		
C_{2v}	Seesaw	Cl_4Te		
C_{2v}		C_3H_2	0,180?	2019 Vogt, Pg. 318
C_{2v}		H_2I_2Si	0,180?	2019 Vogt, Pg. 102
C_{2v}		H_2O_2Si		2019 Vogt, Pg. 107
C_{2v}		$(CO_2)(N_2)$		
C_s(syn)		BFH_2O		
C_s(syn-anti)		CH_2O_2		
C_s		CN_4		
C_s		C_2H_3		
C_s		BF_2HO		
C_s		CH_3OH		
C_s		ClH_2NaO		
C_s		HNO_3		
C_s		H_2O_2Si		
C_s	Non-planar	CH_2N_2		
C_s		$CBrF_2N$		
C_s		$CHClF_2$		
C_s		$(CO)(N_2O)$		
C_s(effective)		ArH_3N		
C_s(effective)		$(SO_2)(CO)$		
C_s(assumed)		H_2N_2O	Given!	
$C_{\infty v}$	Linear	CH_3N		
	Linear	$(CO)(HCN)$		
$D_{\infty h}$	Linear	C_5		
$D_{\infty h}$	Linear	C_3Ge_2		
$D_{\infty h}$	Linear	C_3H_2		
	Quasi-linear	C_3O_2		