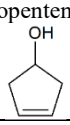
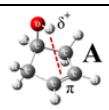
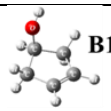
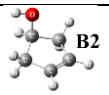
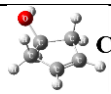
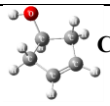
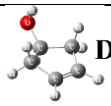
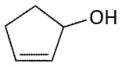
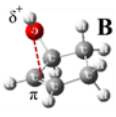
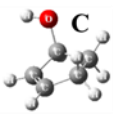
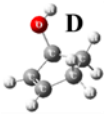
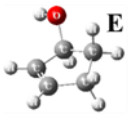
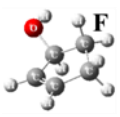
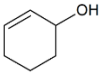
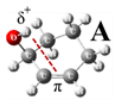
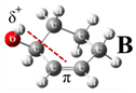
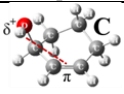
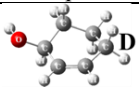
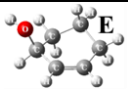
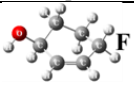
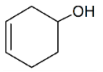
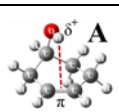
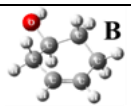
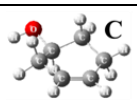
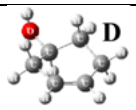
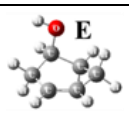
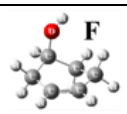
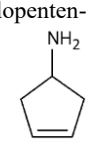
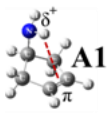
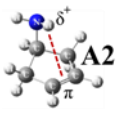
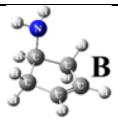
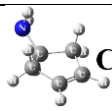
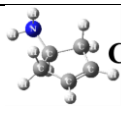
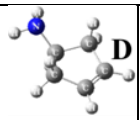
Supplementary Material

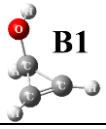
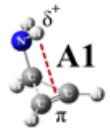
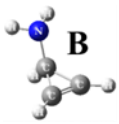
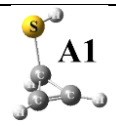
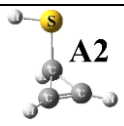
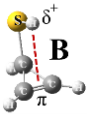
Supplementary Table S1. Calculated relative energies and observed OH and C=C vibrational frequencies of cyclic alcohols in the vapor phase.

Molecule		Conformers						Reference
3-cyclopenten-1-ol 								
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	254	254	434	434	460	This work
	OH bond stretch (cm^{-1})	3623	3655	3655	3659	3659	3638	[50,51]
	C=C bond stretch (cm^{-1})	1607	1620	1620	1615	1615	1609	[50,51]
2-cyclopentent-1-ol 								
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	65	255	327	337	343	This work
	OH bond stretch (cm^{-1})	3632	3632	3654	3644	3664	3664	[53]
	C=C bond stretch (cm^{-1})	1609	Not reported	Not reported	Not reported	Not reported	Not reported	[53]
2-cyclohexen-1-ol 								
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	40	211	256	302	311	This work
	OH bond stretch (cm^{-1})	3646	3632	3654	3649	3644	3650	[54]
	C=C bond stretch (cm^{-1})	1652	1654	1657	1662	1662	1662	[54]
3-cyclohexen-1-ol 								
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	9	51	99	239	309	This work
	OH bond stretch (cm^{-1})	3647	3675	3675	3656	---	---	[55]

Supplementary Table S2. Calculated relative energies and observed NH_2 and C=C vibrational frequencies of 3-cyclopenten-1-amine in the vapor phase.

3-cyclopenten-1-amine 								
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	0	128	190	190	200	This work
	NH_2 antisymmetric stretch	3391	3391	3396	3403	3403	3394	[59]
	NH_2 symmetric stretch	3329	3329	3335	3335	3335	3335	[59]
	C=C bond stretch (cm^{-1})	1613	1613	1613	1599	1599	1603	[59]

Supplementary Table S3. Calculated relative energies and (O,N,S)H and C=C stretch frequencies of 2-cyclopropen-1-ol, 2-cyclopropen-1-amine and 2-cyclopropen-1-thiol.

Molecule		Conformers			Reference
2-cyclopropen-1-ol 					
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	166	166	This work
	OH bond stretch (cm^{-1})	3643	3658	3658	[57]
	C=C bond stretch (cm^{-1})	1600	1618	1618	[57]
2-cyclopropen-1-amine 					
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	0	143	This work
	NH_2 antisymmetric stretch	3414	3414	3406	[57]
	NH_2 symmetric stretch	3345	3345	3346	[57]
	C=C bond stretch (cm^{-1})	1607	1607	1636	[57]
2-cyclopropen-1-thiol 					
	Relative energy (cm^{-1}) *CCSD(T)/aug-cc-pVTZ*	0	0	81	This work
	SH bond stretch (cm^{-1})	1338	1338	1337	[57]
	C=C bond stretch (cm^{-1})	1636	1636	1614	[57]