

# LIST OF CHEMICALS IN SPACE

This list compiled from: [http://www.ph1.uni-koeln.de/vorhersagen/molecules/main\\_molecules.html](http://www.ph1.uni-koeln.de/vorhersagen/molecules/main_molecules.html)

All molecules have been detected (also) by rotational spectroscopy in the radiofrequency to far-infrared regions unless indicated otherwise.

\* indicates molecules that have been detected by their rotation-vibration spectrum,

\*\* those detected by electronic spectroscopy only.

Transition metal molecules detected in atmospheres of stars by electronic spectroscopy are currently not included. Tentative detections are indicated by "?". These include molecules for which (partial) overlap of lines cannot be ruled at the moment.

2 atoms	3 atoms	4 atoms	5 atoms	6 atoms	7 atoms
H <sub>2</sub>	C <sub>3</sub> *	c-C <sub>3</sub> H	C <sub>5</sub> *	C <sub>5</sub> H	C <sub>6</sub> H
AlF	C <sub>2</sub> H	l-C <sub>3</sub> H	C <sub>4</sub> H	l-H <sub>2</sub> C <sub>4</sub>	CH <sub>2</sub> CHCN
AlCl	C <sub>2</sub> O	C <sub>3</sub> N	C <sub>4</sub> Si	C <sub>2</sub> H <sub>4</sub> *	CH <sub>3</sub> C <sub>2</sub> H
C <sub>2</sub> **	C <sub>2</sub> S	C <sub>3</sub> O	l-C <sub>3</sub> H <sub>2</sub>	CH <sub>3</sub> CN	HC <sub>5</sub> N
CH	CH <sub>2</sub>	C <sub>3</sub> S	c-C <sub>3</sub> H <sub>2</sub>	CH <sub>3</sub> NC	HCOCH <sub>3</sub>
CH <sup>+</sup>	HCN	C <sub>2</sub> H <sub>2</sub> *	CH <sub>2</sub> CN	CH <sub>3</sub> OH	NH <sub>2</sub> CH <sub>3</sub>
CN	HCO	CH <sub>2</sub> D <sup>+</sup> ?	CH <sub>4</sub> *	CH <sub>3</sub> SH	c-C <sub>2</sub> H <sub>4</sub> O
CO	HCO <sup>+</sup>	HCCN	HC <sub>3</sub> N	HC <sub>3</sub> NH <sup>+</sup>	H <sub>2</sub> CCHOH
CO <sup>+</sup>	HCS <sup>+</sup>	HCNH <sup>+</sup>	HC <sub>2</sub> NC	HC <sub>2</sub> CHO	
CP	HOC <sup>+</sup>	HNCO	HCOOH	NH <sub>2</sub> CHO	
CSi	H <sub>2</sub> O	HNCS	H <sub>2</sub> CNH	C <sub>5</sub> N	
HCl	H <sub>2</sub> S	HOCO <sup>+</sup>	H <sub>2</sub> C <sub>2</sub> O	l-HC <sub>4</sub> H* (?)	
KCl	HNC	H <sub>2</sub> CO	H <sub>2</sub> NCN		
NH	HNO	H <sub>2</sub> CN	HNC <sub>3</sub>		
NO	MgCN	H <sub>2</sub> CS	SiH <sub>4</sub> *		
NS	MgNC	H <sub>3</sub> O <sup>+</sup>	H <sub>2</sub> COH <sup>+</sup>		
NaCl	N <sub>2</sub> H <sup>+</sup>	NH <sub>3</sub>			
OH	N <sub>2</sub> O	c-SiC <sub>3</sub>			
PN	NaCN	CH <sub>3</sub> *			
SO	OCS				
SO <sup>+</sup>	SO <sub>2</sub>				
SiN	c-SiC <sub>2</sub>				
SiO	CO <sub>2</sub> *				
SiS	NH <sub>2</sub>				
CS	H <sub>3</sub> **				
HF	H <sub>2</sub> D <sup>+</sup> , HD <sub>2</sub> <sup>+</sup>				
SH*	SiCN				
HD	AlNC				
FeO ?					
O <sub>2</sub> ?					

<b>8 atoms</b>	<b>9 atoms</b>	<b>10 atoms</b>	<b>11 atoms</b>	<b>12 atoms</b>	<b>13</b>
CH <sub>3</sub> C <sub>3</sub> N	CH <sub>3</sub> C <sub>4</sub> H	CH <sub>3</sub> C <sub>5</sub> N (?)	HC <sub>9</sub> N	C <sub>6</sub> H <sub>6</sub> * (?)	HC <sub>11</sub> N
HCOOCH <sub>3</sub>	CH <sub>3</sub> CH <sub>2</sub> CN	(CH <sub>3</sub> ) <sub>2</sub> CO			
CH <sub>3</sub> COOH	(CH <sub>3</sub> ) <sub>2</sub> O	(CH <sub>2</sub> OH) <sub>2</sub> ?			
C <sub>7</sub> H	CH <sub>3</sub> CH <sub>2</sub> OH	H <sub>2</sub> NCH <sub>2</sub> COOH			
Glycine ?					
H <sub>2</sub> C <sub>6</sub>	HC <sub>7</sub> N	CH <sub>3</sub> CH <sub>2</sub> CHO			
CH <sub>2</sub> OHCHO (?)	C <sub>8</sub> H				
l-HC <sub>6</sub> H* (?)					
CH <sub>2</sub> CHCHO (?)					

Research these compounds at the following websites:

<http://webbook.nist.gov/chemistry/form-ser.html>

<http://physics.nist.gov/cgi-bin/micro/table5/start.pl>

For each compound, record the name, structure, CAS number and the frequency of its spectral lines. What else can you find out about these compounds?