*#Jenny*

*Finally I get this ebook, thanks for all these  I can get now!*

*#Rio*

*Cool! I'am really happy*

*#Markus Jensen*

*I did not think that this would work, my best friend showed me this website, and it does! I get my most wanted eBook*

*#Hun Tsu*

*wtf this great ebook for free?!*

*#Che Salsa*

*My friends are so mad that they do not know how I have all the high quality ebook which they do not!*

*#Diego Butler*

*so many fake sites. this is the first one which worked! Many thanks*

The chemical composition of Earth's atmosphere V: the major carbon-bearing species

| Mole % | Name | Chemical formula | Residence Time |
|---|---|---|---|
| 78.084 | Nitrogen | $N_2$ | $10^8$-$10^9$ years |
| 20.948 | Oxygen | $O_2$ | 3000-10,000 ye |
| 0.934 | Argon | Ar | Forever |
| 0.004 - 4 | Water vapor | $H_2O$ | ~10 days |
| **0.0385 (385 ppm)** | **Carbon dioxide** | $CO_2$ | **2-10 years** |
| 0.001818 (18.18 ppm) | Neon | Ne | Forever |
| 0.000524 (5.24 ppm) | Helium | He | ~$10^6$ years |
| **0.00017 (1.7 ppm)** | **Methane** | $CH_4$ | **2-10 years** |
| 0.000114 (1.14 ppm) | Krypton | Kr | Forever |
| 0.00005 - 0.0010 | Stratospheric ozone | $O_3$ | |
| 0.000055 (0.55 ppm) | Hydrogen | $H_2$ | 4-8 years |
| 0.000033 (0.33 ppm) | Nitrous oxide | $N_2O$ | 5-200 years |
| **0.0000050 - 0.0000200** | **Carbon monoxide** | CO | **60-200 days** |
| 0.0000087 (87 ppb) | Xenon | Xe | Forever |
| 0.0000010 - 0.0000500 | Tropospheric ozone | $O_3$ | |
| **0.0000005 - 0.0000020** | **NMHC** (Non-methane hydrocarbons) | $C_xH_y$ | |
| 0.0000000540 (540 ppt) | CFC12 | $CF_2Cl_2$ | >60 years |
| 0.000000505 (500 ppt) | Carbonyl sulfide | OCS | ~ 2 years |
| 0.000000265 (265 ppt) | CFC11 | $CFCl_3$ | ~60 years |
| 0.00000001 - 0.0000001 | Hydrogen peroxide | $H_2O_2$ | 1 day |
| 0.00000001 - 0.0000001 | Formaldehyde | $CH_2O$ | 5-10 days |
| 0.0000000098 (98 ppt) | Carbon tetrachloride | $CCl_4$ | ≈ decades |
| 0.0000000965 (65 ppt) | Methylchloroform | $CH_3CCl_3$ | ~7 years |
| 0.0000000001 - 0.0001 | Nitrogen oxides | $NO_x$ | A few days |
| 0.0000000001 - 0.0000001 | Ammonia | $NH_3$ | A few days |
| 0.0000000001 - 0.0000001 | Sulfur dioxide | $SO_2$ | hours to week |
| 0.0000000001 - 0.00000001 | Dimethyl sulfide | $CH_3SCH_3$ | <1 day |
| 0.0000000001 - 0.00000003 | Carbon disulfide | $CS_2$ | ~40 days |
| 0.0000000005 - 0.00000005 | Hydrogen sulfide | $H_2S$ | <5 days |
| 0.0000000002 (2 ppt) | Hydroperoxyl radical | $HO_2$ | |
| 0.0000000000005 (0.05 ppt) | Hydroxyl radical | OH | ≤ a few seconc |

Carbon is present in a variety of forms in Earth's atmosphere. The four most abundant forms, which are highlighted here, span the range of carbon's nominal oxidation numbers. For example, the most abundant form of carbon is $CO_2$, with C in its nominal 4+ and thus most oxidized state, as one would expect in an oxidizing atmosphere. However, the second most abundant is methane, $CH_4$, where C is in its nominal 4- and thus most reduced state. Next is carbon monoxide, CO, where carbon has a nominal charge of 2+. Fourth is a mixture of various hydrocarbons (ethane, propane, and the longer hydrocarbon chains), where the nominal charge on carbon is 2- to 3-. This range of oxidation states of carbon is an illustration of the extent to which the atmosphere is not a system at redox equilibrium.

A single number is shown here for the concentration of $CO_2$, but it's very much a moving target. The $CO_2$ concentration of the atmosphere varies seasonally, reaching lesser values in summer with increased photosynthesis and greater values in winter with less photosynthesis. That seasonal oscillation is superposed on a long-term increase that began in the 1800s with humans' burning of fossil fuels. Another reason for that long-term increase has been human land use (mostly deforestation and plowing of grasslands), which both lessens carbon storage in plant biomass and facilitates oxidation of soil organic matter.

Methane's concentration has also increased as the result of human activity. Rice paddies and landfills generate methane, and the cattle that humans raise generate methane in their digestive tracts. Human production of $CO_2$ and methane has been a source of concern because increased concentrations of both cause an enhanced greenhouse effect and thus warming of the atmosphere.

Sources: see Part I of this series.

## Download PDF version of :

**Ideal Gas Law If8766 Answers With Work**