

CHEM 302: Mid-Term Review 2007
Chapters 1 - 4

Terms

Troposphere, stratosphere	Catalytic depletion cycles (freons, halons)
Temperature profiles	Smog, Photochemical smog
Photochemistry	Residence time (lifetime)
Radicals	Half-lives
Solar irradiance (UVa, UVb, UVc)	Thermal and Photochemical rate constants
Planetary boundary layer	Steady state concentrations
Ozone depletion potential	Exhaust emissions
Ozone hole (Polar Stratospheric Clouds)	$\Delta H^{\circ}_{\text{rxn}}$
Atmospheric composition	Bond dissociation energy (BDE)
Sources, Sinks and Reservoirs	Greenhouse effect

Chemical Species

hydroxyl radical	OH	CFC's, HCFC's	CFC-xyz
hydroperoxyl	O ₂ H	aldehydes	RCHO
singlet atomic O	O*	formaldehyde	CH ₂ O
ozone	O ₃	hydrocarbons	HC's
nitrous oxide	N ₂ O	peroxyacetylnitrate (PAN)	CH ₃ CO ₂ ONO ₂
nitric oxide	NO	chlorine nitrate	ClONO ₂
nitrogen dioxide	NO ₂	dimethyl sulfide	(CH ₃) ₂ S
dinitrogen pentoxide	N ₂ O ₅	nitric acid	HNO ₃
carbon monoxide	CO	hypochlorous acid	HOCl
carbon dioxide	CO ₂	carbonic acid	H ₂ CO ₃
sulfur dioxide	SO ₂	sulfurous acid	H ₂ SO ₃
sulfur trioxide	SO ₃	sulfuric acid	H ₂ SO ₄
chlorine	Cl		
chlorine oxide	ClO		

Chemical Reactions

Chapman Reactions
Ozone Depletion Cycles
Hydroxyl Radical Production
Hydrocarbon Oxidations
PAN Production

Calculations

units of concentration (P, molecules/ cm³, ppmv, ppbv, mol/L, μg/m³)
pressure and number density at altitude
residence times and flux rates
rates of reaction, first, second and pseudo first order
steady state concentrations