Aerosol Files in HITRAN2020

1. Summary

A overview of the refractive indices included in HITRAN2020 [1] are summarized in Table 1. Please refer to the `Readme.txt` for an explanation of how to download and use the aerosol data and programs contained in `hitran_ri.tar`. If you have any questions, please contact Steven Massie at the Laboratory for Atmospheric and Space Physics (LASP), University of Colorado, Boulder, Colorado (1-303-735-6583, Steven.Massie@lasp.colorado.edu).

Table 1: Refractive indices included in HITRAN2020.

Compound	Measurement Specifics	Reference
Water, ice, sodium chloride, sea salt, water soluble aerosol, ammonium sulfate, carbonaceous aerosol, volcanic dust, sulfuric acid, meteoric dust, quartz, hematite, sand	Room temperature, 0.2–40 μm	[2]
Water	27°C, 10–5000 cm^{-1}	[3]
Supercooled water	238 – 269 K, 1100 – 4500 cm^{-1}	[4]
Ice	266 K, 0.04μm – 2 m	[5]
Ice	130 – 210 K, 800 – 4000 cm^{-1}	[6]
Sulfuric acid (H_2SO_4/H_2O)	215 K, 499–6996 cm^{-1}	[7]
Sulfuric acid (H_2SO_4/H_2O)	273 – 298 K, 400 – 7500 cm^{-1}	[8]
Nitric acid (HNO_3)	223 – 293 K, 450 – 6500 cm^{-1}	[9]
Ternary Solutiion ($H_2SO_4/H_2O/HNO_3$)	203 – 293 K, 450 – 6500 cm^{-1}	[9]
NAD (nitric acid dihydrate)	160–190 K, 700–4700 cm^{-1}	[10]
NAT (nitric acid trihydrate)	160 K, 711–4004 cm^{-1}	[11]
Amorphous nitric acid (aNAM, aNAD, aNAT)	153 K, 482–7000 cm^{-1}	[12]
NAM (nitric acid monohydrate)	179 K, 482–6002 cm^{-1}	[12]
NAD	184 K, 482–6981 cm^{-1}	[12]
αNAT	181 K, 482–6989 cm^{-1}	[12]
βNAT	196 K, 482–6364 cm^{-1}	[12]
Saharan dust	0.30 – 0.95 μm	[13]
Volcanic ash	0.45 – 25 μm	[14]
Volcanic ash	690 – 32500 cm^{-1}	[15]
SOA	0.23 – 1.2 μm	[16]
SOA	0.23 – 1.2 μm	[17]
Organic acids (Oxalic, malonic, succinic, pinonic, pyruvic, phthalic)	0.25 – 1.1 μm	[18]
Brown carbon	0.2 – 1.2 μm	[19]
Burning vegetation	525–5000 cm^{-1}	[20]
Burning vegetation	0.35 – 1.5 μm	[21]
Carbon flame	0.4 – 0.7 μm, 25 – 600°C	[22]
Flame soot	0.2 – 38 μm	[23]
Minerals (clay, illite, kaolin, montmorillonite)	2.5 – 200 μm	[24]
Minerals (granite, montmorillonite)	5 – 40 μm	[25]
Titan tholins	0.02 – 920 μm	[26]

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Table1 – *Continued from previous page*

Compound	Measurement Specifics	Reference
Titan tholins	0.2 – 1 μm	[27]
Titan tholins	2.5 – 25 μm	[28]
KCl	0.22 – 166 μm	[24]
ZnS	0.22 – 166 μm	[24]
SiO_2 (amorphous)	6.6 - 487 μm, 10 – 300 K	[29]
SiO_2 (crystalline)	6.25 μm – 10 μm, 300 – 928 K	[30]
Al_2O_3	7.8 – 200 μm	[31]
FeO	0.2 – 500 μm	[32]
$CaTiO_3$ (Perovskite)	2.0 – 500 μm	[33]
Fe_2O_3	0.1 – 1000 μm	[34]
Fe_2SiO_4 (Fayalite)	0.4 – 10 μm	[35]
Fe_2SiO_4 (Fayalite)	2 μm– 10 μm	[36]
$MgAl_2O_4$ (annealed)	1.6 – 6825 μm	[37]
$MgAl_2O_4$ (natural)	2.0 μm – 10 μm	[37]
Mg_2SiO_4	0.19 – 948 μm	[38]
$MgSiO_3$	0.2 - 500 μm	[38]
TiO_2 (Rutile)	0.47 – 36.2 μm	[39]
TiO_2 (Anatase)	2.0 – 5843 μm	[39]
TiO_2 (Brookite)	2.0 – 5843 μm	[40]
Supplementary		
Water and Ice	0.67 – 2.5 μm, imaginary	[41]
Saharan Dust	0.35 -0.65 μm	[42]
SOA	0.375 and 0.632 μm, various radical sources	[43]
SOA	0.532 μm, various cases	[44]
Diesel Soot	0.45 – 10 μm	[24]
Sulfuric acid (H_2SO_4/H_2O)	200–300 K, 825–4700 cm^{-1}	[45]
Sulfuric acid (H_2SO_4/H_2O)	183- 293 K, 2 – 23 μm	[46]
Nitric acid (H_2SO_4/HNO_3)	213–293 K, 2 – 23 μm	[46]
Sulfuric acid (H_2SO_4/H_2O)	Room temperature, 75 and 90% H_2SO_4	[47]
Nitric acid (H_2SO_4/HNO_3)	220 K, 754–4700 cm^{-1}	[48]
Nitric acid (H_2SO_4/HNO_3)	Room temperature, 2 – 40 μm	[49]
Sulfuric and Nitric acids	Room temperature, 6 – 11 μm	[50]
Titan organic haze	0.532 μm (single wavelength)	[51]

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