

COLLISION BROADENING OF NH₃ BY D₂ FROM 15 K TO 40 K

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We report low temperature pressure broadening cross sections for the $(J, K) = (1, 1)$, $(2, 2)$ and $(3, 3)$ inversion transitions of NH₃ broadened by molecular deuterium from 15 to 40 K. These D₂ broadening studies serve to complement our earlier work on the low temperature pressure broadening of NH₃ by He, normal-H₂ and para-H₂. While D₂ has nearly the same mass as He, its electronic structure is similar to H₂. Owing to its greater mass and consequent decreased velocity relative to H₂, the expectation is that cross sections for NH₃ collisions with D₂ will be smaller than cross sections for H₂ at a given temperature or energy. However, experimentally we find the NH₃-D₂ cross sections are larger than for broadening by normal-H₂, $J = 0$, para-H₂ and He.