ACTIVATIONLESS REACTION OF NH (X $^3\Sigma^-$) AND O_2 IN SOLID Xe: FORMATION AND INFRARED SPECTRUM OF HNOO

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The activationless reaction of ground-state NH (X $^3\Sigma^-$) with molecular oxygen is studied by annealing a solid Xe matrix containing O_2 and trapped NH radicals formed upon UV photolysis of HN_3. The infrared absorptions which appear during this process are assigned to imine peroxide, HNOO, a new intermediate. Upon further long-wavelength photolysis, imine peroxide is destroyed, isomerizing to nitrous acid, HONO. Some features of the potential energy surface of this molecule are elucidated and are found to be in good qualitative agreement with published ab initio calculations.