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ATMOSPHERIC REMOVAL OF PEROXYNITRIC ACID (PNA, HO2NO2): RATES OF THERMAL DECOMPOSITION AND PRODUCTS OF UV PHOTOLYSIS.

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Peroxynitric acid, HO2NO2, formed in the atmosphere by the association reaction of hydroperoxy radical, HO2, with NO2, is an important reservoir for both NOx (=NO and NO2) and HOx (=OH and HO2), especially in the lower stratosphere and upper troposphere. However until now there are many uncertainties in the rates of removal of PNA molecule from the atmosphere. The processes that control its removal from atmosphere are: (i) thermal decomposition, (ii) UV photolysis; (iii) reaction with OH and (iv) visible/near IR photolysis. We have quantified the rates of these processes via laboratory studies. The removal of PNA via its reaction with OH and visible/near IR photolysis were described elsewhere. Here we will present results of our studies on the rate coefficients for the thermal decomposition of PNA and production of HO2, OH and NO3 in the UV photolysis of PNA. We will present our measurement of the rate coefficients for the thermal decomposition of PNA and our calculated value for the standard enthalpy of HO2NO2. We will also present our results of the quantum yields for HO2, OH and NO3 in UV photolysis of PNA. The atmospheric implication of our findings will be discussed.