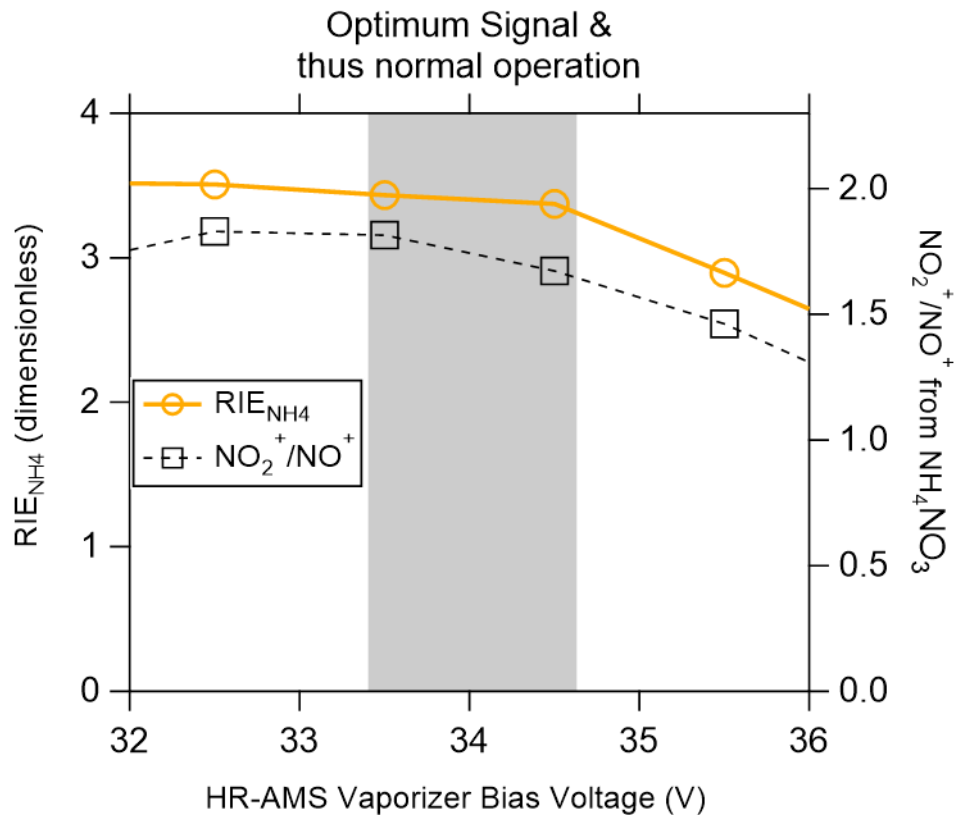**Figure S6** Left: comparison of the fragmentation patterns of O_2 and N_2 in the HR-AMS to those in the NIST database. Right: measured response of the AMS microchannel plate to single ions as a function of *m/z*. Only *m/z* at which the signal is dominated by individual ions events, based on ion detection frequencies while analyzing the AMS background signal, are shown.

Figure S7 Variation of RIE_{NH4} and the NO_2^+/NO^+ ratio as a function of HR-AMS vaporizer bias voltage while sampling pure NH_4NO_3 particles. Only ~2% variation is observed for RIE_{NH4} across the optimum tuning region, while ~8% variation is observed for the NO_2^+/NO^+ ratio.