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MEASUREMENT OF THE ELECTRIC DIPOLE MOMENT AND MAGNETIC g-FACTOR IN NEODYMIUM MONOXIDE (NdO)

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The diatomic oxides of the lanthanides and actinides have many low-lying electronic states due to the presence of open f and d orbitals on the metal. The magnetic and electric tuning of the fine structure is an effective means of identifying the dominant configuration of a particular electronic state. Here we report on the first high-resolution molecular beam measurements of the Stark and Zeeman effects in electronic transitions of neodymium monoxide, NdO. Numerous branch features in the previously detected [16.73] (Ω=3) - $X(\Omega$=4) electronic transition were recorded at near natural linewidth limit (FWHM $<$ 35MHz) field free and in the presence of tunable static magnetic (Zeeman effect) and electric (Stark effect) fields. The Stark and Zeeman splittings and shifts were used to extract values for the magnitudes of the permanent electric dipole moments and magnetic g-factors respectively of the two electronic states. The results are compared with those that we reported last year for uranium monoxide, UO[a], which is the actinide analogue of NdO.

[a] Michael C. Heaven, Vasiliy Goncharov, Timothy C. Steimle, Tongmei Ma and Colan Linton *J. Chem Phys.* **125**, 204314/1-20431/11, (2006).

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