THE PURE ROTATIONAL SPECTRUM OF KO

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The pure rotational spectrum of potassium monoxide (KO) has been recorded using millimeter-wave direct absorption spectroscopy. KO was synthesized by the reaction of potassium vapor, produced in a Broida-type oven, with nitrous oxide. No DC discharge was necessary. Eleven rotational transitions belonging to the $^2\Pi_{3/2}$ spin-orbit component have been measured and have been fit successfully to a case (c) Hamiltonian. Rotational and lambda-doubling constants for this spin-orbit component have been determined. It has been suggested that the ground electronic state of KO is either $^2\Pi$ (as for LiO and NaO) or $^2\Sigma$ (as for RbO and CsO), both of which lie close in energy. Recent computational studies favor a $^2\Sigma$ ground state. Further measurements of the rotational transitions of the $^2\Pi_{1/2}$ spin-orbit component and the $^2\Sigma$ state are currently in progress, as well as the potassium hyperfine structure.