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 \( ^2\Pi \) 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.