The pure rotational spectra of several alkali and alkaline-earth amide species have been recorded using millimeter/sub-millimeter direct absorption techniques. These molecules were created by the reaction of metal vapor, generated in a Broida-type oven, with ammonia gas. Eight transitions of CaNH₂ were measured in the frequency range 320-530 GHz, for Ka=0,1,2,3,4, and 5. CaNH₂ had been studied previously by optical spectroscopy. For NaNH the Ka=0,1,2,3,4, and 5 components in ten separate rotational transitions were recorded. This study is the first gas phase detection of this molecule. The spectra of both amides were analyzed using the S-reduced Hamiltonian and rotational, centrifugal distortion, and, in the case of CaNH₂, fine structure parameters determined. Both molecules appear to be planar species with C₂ᵥ symmetry. Studies are currently being carried out for magnesium and strontium analogs.