HYPERFINE INTERACTIONS IN CrN AND MoN

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Pure rotational transitions of $^{52}$Cr$^{14}$N and $^{96}$Mo$^{14}$N radicals in their $X^4\Sigma^-$ state were recorded using a pump/probe microwave-optical double resonance (PPM0DR) technique from which the hyperfine parameters of $^{14}$N ($I = 1$) were precisely determined. In addition, the (0, 0) $A^4\Pi - X^4\Sigma^-$ band system of a $^{52}$CrN molecular beam sample was re-recorded from which the hyperfine parameters of $^{52}$Cr ($I = 3/2$) were determined. A simple molecular orbital model is used to rationalise the newly determined hyperfine interactions for $^{52}$Cr and $^{14}$N in CrN and $^{14}$N in MoN and the previously determined hyperfine interactions for other early transition metal mononitrides. An improved set of fine structure parameters for the CrN and MoN are determined.

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