ENDOR study of the heterometallic wheel
\[ ((\text{CH}_3)_2\text{NH}_2)[\text{Cr}_7\text{NiF}_8(\text{O}_2\text{CCCH}_3)]_{16} \]

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The crystallographically characterised family of heterometallic wheels\(^1\) \[ \text{Cr}_7\text{MF}_8(\text{O}_2\text{CCCH}_3)_{16}^- \], where \( M = \text{Ni}^{\text{II}}, \text{Co}^{\text{II}}, \text{Mn}^{\text{II}} \) or \( \text{Fe}^{\text{II}} \), prepared directly from the homometallic \[ \text{Cr}_8\text{F}_8(\text{O}_2\text{CCCH}_3)_{16} \], shows adjacent antiferromagnetically coupled metal ions bridged by one \( \mu_2^-\text{F} \) and two \( \mu^-\text{1,3-pivalates} \) (Fig. 1). A dialkylammonium cation in the centre of the metallocycle forms three N-H-F bonds. Paramagnetic ground spin states can be tuned by the choice of \( M(\text{II}) \). For example, Q-band EPR of \{Cr\( _7\text{Ni} \)\}, the title compound (1), at 5 K shows an axial \( S = \frac{1}{2} \) spectrum with \( g_x = 1.740 \) and \( g_{xy} = 1.781 \). An ENDOR investigation (Fig. 2) of \{Cr\( _7\text{Ni} \)\} at both X- and Q-band frequencies shows coupling to \( ^1\text{H} \) and \( ^{14}\text{N} \) nuclei of the bridging ammonium cations in the cavity of the wheel. Most surprisingly no hyperfine coupling to \( ^{19}\text{F} \) has been detected, despite extensive variation of experimental parameters. The electronic structure of 1, as revealed by ENDOR data, will be described.