Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supplementary information

S1 Quantitation using the DI method

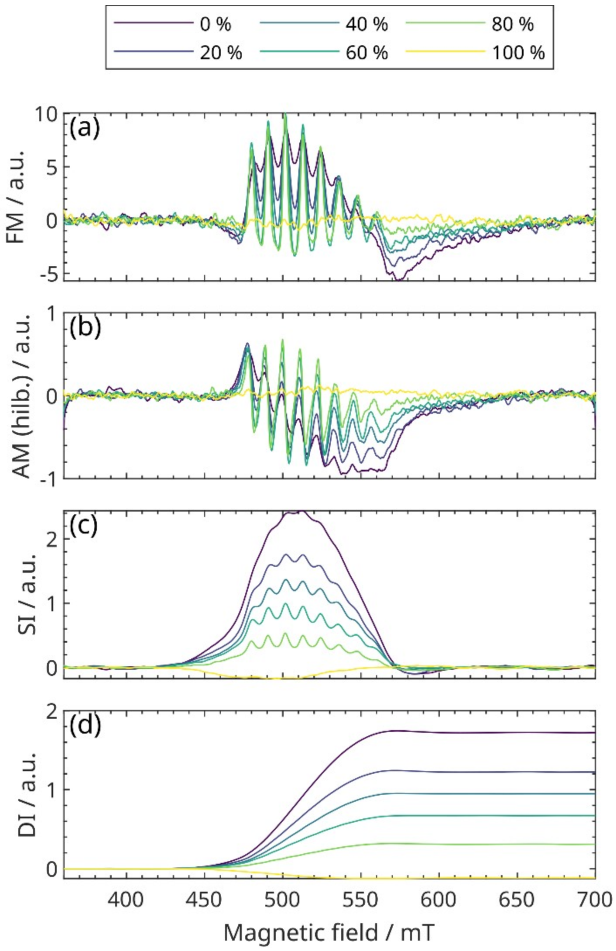

Figure S1 Quantitation of the EPRoC FM signal after the Hilbert transformation via the Kramers-Kronig relation followed by double integration.

S2 Estimation of the absolute spin sensitivity of the EPRoC sensor

The absolute spin sensitivity of an EPRoC sensor may be estimated using Eq. (70) in ref. [45]:

$$N_{min} = \frac{24 k_B^{3/2} T^{3/2} \sqrt{R_{coil}}}{\gamma^3 \hbar^2 B_u B_0^2}$$

where k_B is the Boltzmann constant, T is the temperature, γ is the gyromagnetic ratio, $\hbar$ is the reduced Planck's constant, R_{coil} is the resistance of the coil, B_0 is the static magnetic field and B_u is the unitary magnetic field of the coil. The latter may be approximated by

$$B_u \approx \frac{\mu_0}{d_{coil}}$$

where μ_0 is the magnetic constant and d_{coil} is the diameter of the coil. For $B_0 = 500$ mT, $T = 300$ K, $R_{coil} = 6.8$ Ω, $d_{coil} = 200$ µm, we obtain approximately $2 \cdot 10^8$ spins.

S3 X-band saturation data of the electrolyte solutions

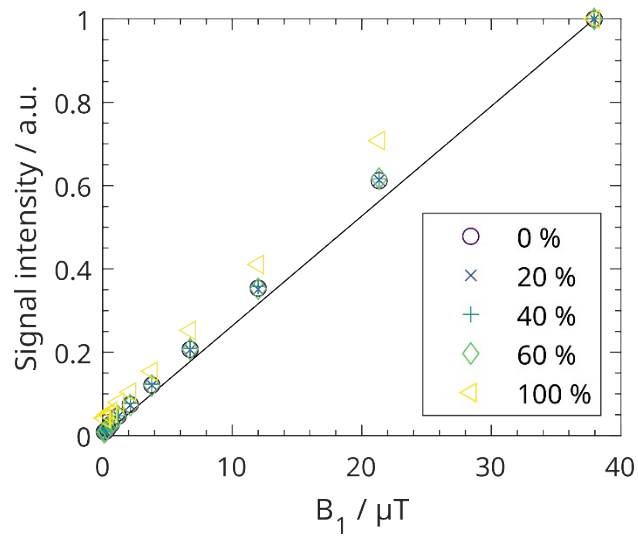

Figure S2 Saturation behaviour of the vanadium electrolyte samples at X-band.