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High Q Factor Microwave Excitations in Organic Ferrimagnet Vanadium Tetracyanoethylene ANDREW FRANSON, MICHAEL CHILCOTE, Ohio State Univ - Columbus, NA ZHU, XUFENG ZHANG, Yale University, IAN FRONING, Ohio State Univ - Columbus, MICHAEL FLATTÉ, University of Iowa, HONG TANG, Yale University, EZEKIEL JOHNSTON-HALPERIN, Ohio State Univ - Columbus — Room temperature magnetism in organic based semiconducting materials is an increasingly active area of research due to the growing interest in spintronic devices and next generation magnetoelectronics. Here we present an investigation into the ferromagnetic resonance and spin wave properties of the organic-based ferrimagnetic semiconductor V[TCNE]$_x$(x∼2, TCNE: tetracyanoethylene). Here we discuss V[TCNE]$_x$ films synthesized by chemical vapor deposition on epitaxially flat, a-plane sapphire substrates that show exceptionally sharp resonant features for both ferromagnetic resonance (FMR) and spin wave resonance studies. Films of 1 μm thickness exhibit a peak to peak linewidth of 1.0 G in FMR studies and spin wave resonance studies reveal thickness standing wave modes over a frequency range of 1 - 5 GHz with quality factors (Q) in excess of 3200 [APL 109, 082402 (2016)]. Further, we find that extending the film thickness to 10 μm further enhances the Q to over 8,000 and reveals fine structure within the standing wave spectra. These results establish the versatility and potential of V[TCNE]$_x$ as a building block for future organic-based spintronic and magnetoelectronic devices.

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