High Q Factor Microwave Excitations in Organic Ferri-
magnet Vanadium Tetracyanoethylene ANDREW FRANSON, MICHAEL
CHILCOTE, Ohio State Univ - Columbus, NA ZHU, XUFENG ZHANG, Yale Uni-
versity, 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 grow-
ing 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(ₙ~2, TCNE; tetra-
cyanoethylene). 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 res-
once 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.

Andrew Franson
Ohio State Univ - Columbus

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