

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

NMR and μ SR studies of Sc (S=0) doping effects in a spin-Peierls system TiOCl T. IMAI, E. MEHES, F.L. NING, S. GOLIN, S.R. SAHA, A. ACZEL, J. RODRIGUEZ, McMaster University, F.C. CHOU, National Taiwan University, G.M. LUKE, McMaster University — TiOCl is a model one-dimensional S=1/2 chain system with an incommensurate phase below $T_c \sim 95$ K and a spin-Peierls ground state below $T_c' \sim 65$ K. We report a detailed NMR and μ SR investigation of the local lattice and spin environment in undoped and Sc (S=0) doped $\text{Ti}_{1-x}\text{Sc}_x\text{OCl}$ ($x = 0, 0.01, \text{ and } 0.03$). Based on ^{35}Cl NMR lineshape measurements, we show that all $\text{Ti}_{1-x}\text{Sc}_x\text{OCl}$ samples exhibit signatures of short-range Peierls distortion starting from as high as $T^* \sim 130$ K. Moreover, the NMR line splits into two peaks below $T_c \sim 95$ K, corresponding to two types of local lattice geometries. Only undoped TiOCl develops sharp double peaks below $T_c' = 65$ K. μ SR measurements reveal no evidence for a magnetic long range order down to 2K, even for $x=0.03$. We will compare our results with x-ray scattering measurements (J.P. Clancy et al., this meeting) and doped CuGeO_3 .

T. Imai
McMaster University

Date submitted: 20 Nov 2006

Electronic form version 1.4