The frequency-dependent electrooptic response of the electroclinic effect in deVries SmA materials

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RUDQUIST, Microtechnology and Nanoscience (MC2), Chalmers Univ of Technology — It is well established that electroclinic switching in standard SmA* materials relates to a reorientation of the molecules in a plane normal to the layers, and thus there is no corresponding change in birefringence due to reorientation about a cone, as is the case in the SmC* phase. When the electrooptic response is then analyzed via lock-in amplifier, the signal at the driving frequency is strong, while the second harmonic response, is non-existent [1]. Using this method we have investigated de-Vries materials W530 and TSiKN65, and show that there is a frequency-dependent second order response – implying an electroclinic switching that corresponds to a change in birefringence, suggesting a reorientation of the molecule about a cone. We will present our findings and a model for the type of electroclinic switching that occurs in these two materials. Work supported by NSF MRSEC Grant DMR-0213918 and The Swedish Foundation for Strategic Research 2002/0388. [1] W. Kuczynski, et. al., Ferroelectrics, 244, [491]/191, (2000)

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