

Optically induced anisotropy and electrooptics in ferroic organic nanocomposites

K. Ozga · G. Lakshminarayana · M. Szota · M. Nabialek ·
S. Tkaczyk · V. Kapustianyk · V. Rudyk ·
G. Myronchuk · S. Danylchuk · A. O. Fedorchuk

Received: 15 May 2013 / Accepted: 26 June 2013 / Published online: 11 July 2013
© Springer Science+Business Media New York 2013

Abstract The occurrence of linear electrooptics and optical anisotropy is observed in the ferroic crystals $[\text{NH}_2(\text{C}_2\text{H}_5)_2]_2\text{CuCl}_4$ embedded into polymethylmethacrylate polymer matrix. The studies were performed for the optically treated bulk crystals and the large-size nanocrystals (with sizes higher than 50 nm) embedded into the polymer matrix. The specimens were both in a form of bulk as well as in the form of the composite films. To understand the mechanisms giving the principal role to the effect we have performed polarized absorption measurements for the samples treated in the external dc-electric field and bicolour 532 nm/1,064 nm laser treatments. The behaviour of the birefringence and of the

K. Ozga

Electrical Engineering Department, Czestochowa University Technology,
Armii Krajowej 17, Czestochowa 42201, Poland

G. Lakshminarayana

Materials Science and Technology Division (MST-7), Los Alamos National Laboratory,
Los Alamos, NM 87545, USA

M. Szota

Institute of Materials Science and Engineering, Technical University of Czestochowa,
Al. Armii Krajowej 19, Czestochowa 42-200, Poland

M. Nabialek · S. Tkaczyk

Institute of Physics, J. Dlugosh University Czestochowa, Armii Krajowej 13/15,
Czestochowa, Poland

V. Kapustianyk · V. Rudyk

Physical Department, Ivan Franko National University of Lviv,
Dragomanowa 50, Lviv, Ukraine

G. Myronchuk (✉) · S. Danylchuk

Solid State Physics, Eastern Ukrainian University, Voli 13, Lutsk, Ukraine
e-mail: galynamyronchuk@yahoo.co.uk

A. O. Fedorchuk

Department of Chemistry, Army Academy named after Hetman Petro Sahaydachnyi,
32 Gvardiyska St, Lviv 79012, Ukraine