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LETTERS TO THE EDITOR

4-Allyloxy-4'-cyanobiphenyl. A Photoluminescing Nematic Liquid Crystalline Compound

V. V. Zuev

Institute of High-Molecular Compounds, Russian Academy of Sciences, Bol'shoi pr. 31, St. Petersburg, 199004 Russia

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We made use of the Williamson reaction to synthesize a photoluminescing nematic liquid crystalline compound 4-allyloxy-4'-cyanobiphenyl. The compound strongly luminesces in dioxane solution in the blue range at λ_{max} 418 nm and absorbs at λ_{max} 315 nm (ε 7000). The luminescence intensity compares with that of anthracene. Nematic range 58–81°C (mp 58°C, clearing point 81°C, nematic–isotropic transition). The temperature ranges differ only slightly from those for an analog, 4-cyano-4'-propylbiphenyl (63.5–75°C [1]).

Thus, we are the first to obtain a nematic compound of the cyanobiphenyl series with a strong photoluminescence in the blue range.

4-Allyloxy-4'-cyanobiphenyl. A mixture of 1 g of 4-cyano-4'-hydroxybiphenyl, 1.3 ml of allyl bromide, 3 g of potash, and 30 ml of DMF was stirred for 5 h at 160°C and then cooled and poured into 250 ml of water. The precipitate that formed was filtered off and recrystallized from ethanol. Yield 1.1 g (96%). IR spectrum (KBr), ν, cm^{-1}: 3042, 3018, 2959, 2894, 2856, 2782, 2172.5 (CN), 1603, 1578, 1555, 1493, 1455, 1291, 1251, 1215, 995, 937, 842. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm (*J*, Hz): 4.59 d (OCH_2, *J* 5.16), 5.32 d ($=CH_2$, *cis*, *J* 10.28), 5.44 d ($=CH_2$, *trans*, *J* 17.65), 6.02–6.12 m (=CH), 7.01 d (*ortho*, *J* 8.84), 7.52 d (*meta*, *J* 8.84), 7.63 d (*meta*, *J* 8.84), 7.68 d (*ortho*, *J* 8.84). Found, %: C 81.45; H 5.50; N 6.10. $C_{16}H_{13}NO$. Calculated, %: C 81.68; H 5.57; N 5.95.

The IR spectrum was obtained on a Bruker Vertex instrument. The ^{1}H NMR spectrum was recorded on a Bruker MSL-400 spectrometer (400 MHz). The UV spectrum was registered in a 1×10^{-5} M dioxane solution on a Specord M-40 spectrophotometer. The luminescence spectrum was obtained in a 1×10^{-5} M dioxane solution on an LS-100-3 spectrofluorimeter (PTI-Canada). The phase transition temperatures were measured on a Boetius hot stage.

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