Chemistry of Heterocyclic Compounds, Vol. 46, No. 4 2010

LETTERS TO THE EDITOR

NEW PHOTOCHROMIC SPIROBENZOFURAN-ISOBENZOFURANS

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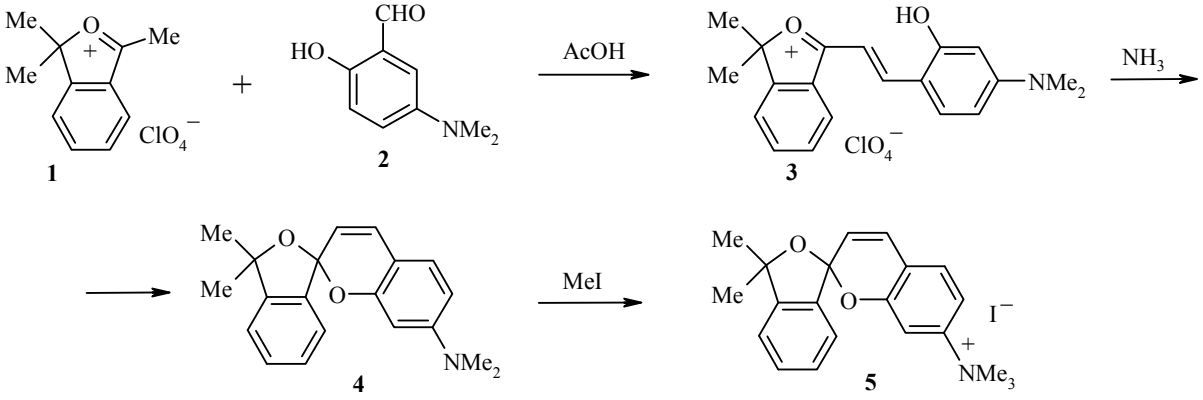
Keywords: isobenzofuran, spirofuran, photochromism.

Cationic spiropyrans (SP^+X^-) have potential for preparation of polyfunctional materials, combining in a single crystal lattice photochromic and magnetic properties [1-3]. We have obtained new spiropyrans of the isobenzofuran series **4**, by alkylation of which with methyl iodide the spirofuran **5** was obtained.



The spiropyrans **4** and **5** possess photochromic properties in solution, connected with the reversible opening of the pyran ring. Along with the thermal recyclization reaction effective photodecolorization was observed.

Electronic absorption spectra were recorded with an Agilent 5483 spectrometer, ^{1}H NMR spectra with a Varian Unity-300 (300 MHz), assignment of the signals *via* the residual protons of the deuterosolvent $CDCl_3$ (δ 7.26 ppm). Photolysis of solutions was carried out with a "Newport" system equipped with a 200 W mercury lamp with an interferometer light filter. Toluene (Aldrich) of spectral purity was used to prepare the solutions.

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Translated from Khimiya Geterotsiklicheskikh Soedinenii, No.4, 630-631, April, 2010. Original article submitted February 10, 2010.

N,N-3',3'-Tetramethyl-3'H-spiro[2H-1-benzopyran-2,1'-isobenzopyran]-7-amine (4). Aldehyde **2** [5] (0.18 g, 1.1 mmol) was added to a boiling solution of the isobenzofuranium salt **1** [4] (0.26 g, 1 mmol) in glacial acetic acid (5 ml), the mixture was boiled for 30 min and then kept at room temperature for 12 h. The dark-blue precipitate was filtered off, washed with ether, dried, and used without further purification. Dry ammonia was passed through a suspension of the perchlorate **3** obtained in benzene (15 ml) until the solid dissolved, the solution was evaporated and the residue was chromatographed on Al_2O_3 (eluent benzene). Yield 67%; mp 102.5-104 °C (2-propanol). UV spectrum (acetonitrile), λ_{max}, nm (log): 317 (4.32), λ_{max} (photoinduced form) nm: 458. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm (*J*, Hz): 1.54 (3H, s, 3'-CH_3); 1.69 (3H, s, 3'-CH_3); 2.92 (6H, s, 7-N(CH_3)$_2$); 5.59 (1H, d, *J* = 9.5, H-3); 6.26 (1H, d, *J* =2.5, H-8); 6.36 (1H, dd, *J* = 8.4, *J* = 2.5, H-6); 6.78 (1H, d, *J* = 9.5, H-4); 7.05 (1H, d, *J* = 8.4, H-5); 7.21-7.46 (4H, m, H-4',5',6',7'). Found, %: C 78.04; H 6.97; N 4.42. $C_{20}H_{21}NO_2$. Calculated, %: C 78.15; H 6.89; N 4.56.

N,N,N-3',3'-Pentamethyl-3'H-spiro[2H-1-benzopyran-2,1'-isobenzofuran]-7-aminium iodide (5). A mixture of spiropyran **4** (0.31 g, 1 mmol), iodomethane (0.62 ml, 10 mmol), and THF (10 ml) was boiled for 6 h and then kept at room temperature for 12 h. The precipitate was filtered off and washed with THF. Yield 67%; mp.151-152°C. UV spectrum (acetonitrile): λ_{max}, nm (log): 247 (4.34), 297 (3.59). λ_{max} (photoinduced form) nm: 454. ^{1}H NMR spectrum ($CDCl_3$), δ, ppm (*J*, Hz): 1.56 (3H, s, 3'-CH_3); 1.70 (3H, s, 3'-CH_3); 3.96 (9H, s, 7-N^+(CH_3)$_3$); 5.96 (1H, d, *J* = 9.8, H-3); 6.88 (1H, d, *J* = 9.8, H-4); 7.09 (1H, d, *J* = 2.8, H-8); 7.24-7.32 (2H, m, H-4',7'); 7.40 (1H, dt, *J* = 7.4, *J* = 1.2, H-6' or H-7'); 7.46 (1H, d, *J* = 8.6, H-5); 7.49 (1H, dt, *J* = 7.4, *J* = 1.3, H-6' or H-7'); 7.64 (1H, dd, *J* = 8.6, *J* = 2.8, H-6). Found, %: C 56.28; H 5.31; N 3.07. $C_{21}H_{24}INO_2$. Calculated, %: C 56.13; H 5.38; N 3.12.

This work was carried out with a financial grants from the Presidium of the Russian Academy of Sciences (Program No.27 “Basic Fundamental Investigations of Nanotechnology and Nanomaterials”), Russian Fund for Fundamental Research (project No. 9-03-00813a), and Ministry of Education and Science of the Russian Federation, Grant of President of the Russian Federation (NSh -363.2008.3).

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