

Letter to the Editor

Lasing properties of 7H-indolo[1,2-a]quinolinium dyes in selected solvents*

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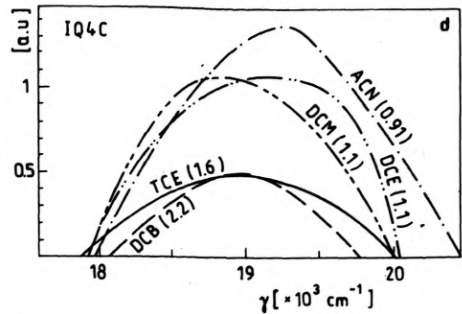
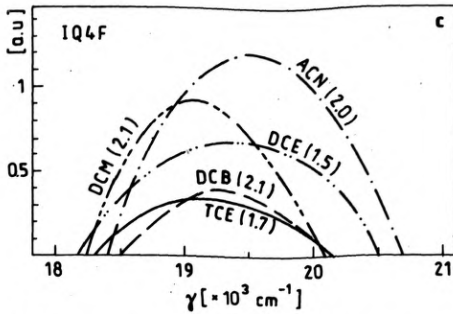
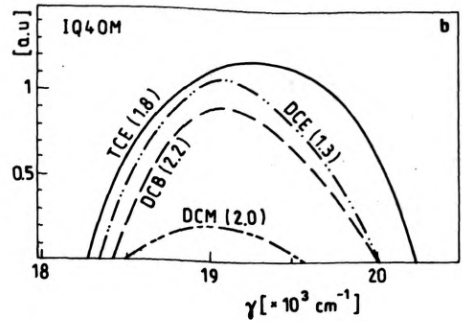
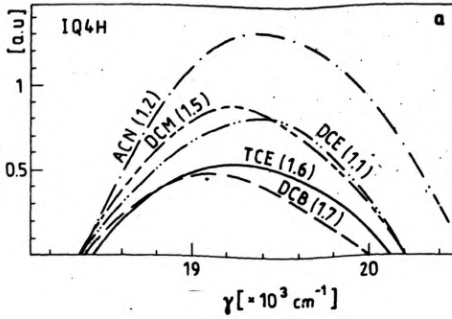
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In our previous paper [1] lasing spectra of eighteen new laser dyes were presented. Solvents for those dyes (dichloromethane and mixture of xylene isomers) were chosen to maximize their fluorescence. Since fluorescence quantum yield allows merely a qualitative evaluation of lasing properties [2], we have decided now to test laser emission of those dyes in several solvents.

In the present paper we report results of lasing properties of chosen indolo[1,2-a]quinolinium dyes: 5-phenyl-7,7-dimethyl-7H-indolo[1,2-a]quinolinium perchlorate (IQ4H), 5-(4-methoxyphenyl)-7,7-dimethyl-7H-indolo[1,2-a]quinolinium perchlorate (IQ4OM), 5-(4-fluorophenyl)-7,7-dimethyl-7H-indolo[1,2-a]quinolinium perchlorate (IQ4F), 5-(4-chlorophenyl)-7,7-dimethyl-7H-indolo[1,2-a]quinolinium perchlorate (IQ4C), in the following solvents: 1,2-dichloroethane (DCE), 1,1,2,2-tetrachloroethane (TCE), 1,2-dichlorobenzene (DCB), acetonitrile (ACN) and dichloromethane (DCM).

The experimental setup was similar to the one described previously. A pulsed nitrogen laser [3] with 6 ns FWHM time, 250 kW peak output power and 55 Hz repetition rate was used to pump the dye laser. The dye solution was flowing transversely in a compact cell [4]. Due to the chemical activity of the solvents used the cell was cemented by means of melted polyethylene. High dispersion rutile prism [5] served as a cavity tuning element. The dye laser resonator outcoupling was 90%. The output power was measured by a sampling oscilloscope (UNITRA OS 1500) with a fast silicon photodiode corrected for a spectrally flat response by comparison with a pyroelectric energy meter (EMCO). The laser wavelength was determined by a prismatic spectroscope.

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Lasing spectra of investigated dyes in selected solvents (in brackets optimal concentrations [mol/l] are given)

From lasing spectra presented in the Figures (a–d) one can conclude that ACN is the best solvent for IQ4F, IQ4H and IQ4C. The output power and the tuning range for these three dyes in ACN are the best. Only for IQ4OM the lasing in this solvent was not observed. In addition, optimal dye concentrations in acetonitrile are the lowest and the latter shows no negative influence on the glues used for construction of the cells.

References

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