

Synthesis of substituted ((benzo[d]thiazol-2-yl) diazenyl) naphthalene-2-ols for holographic recording media application



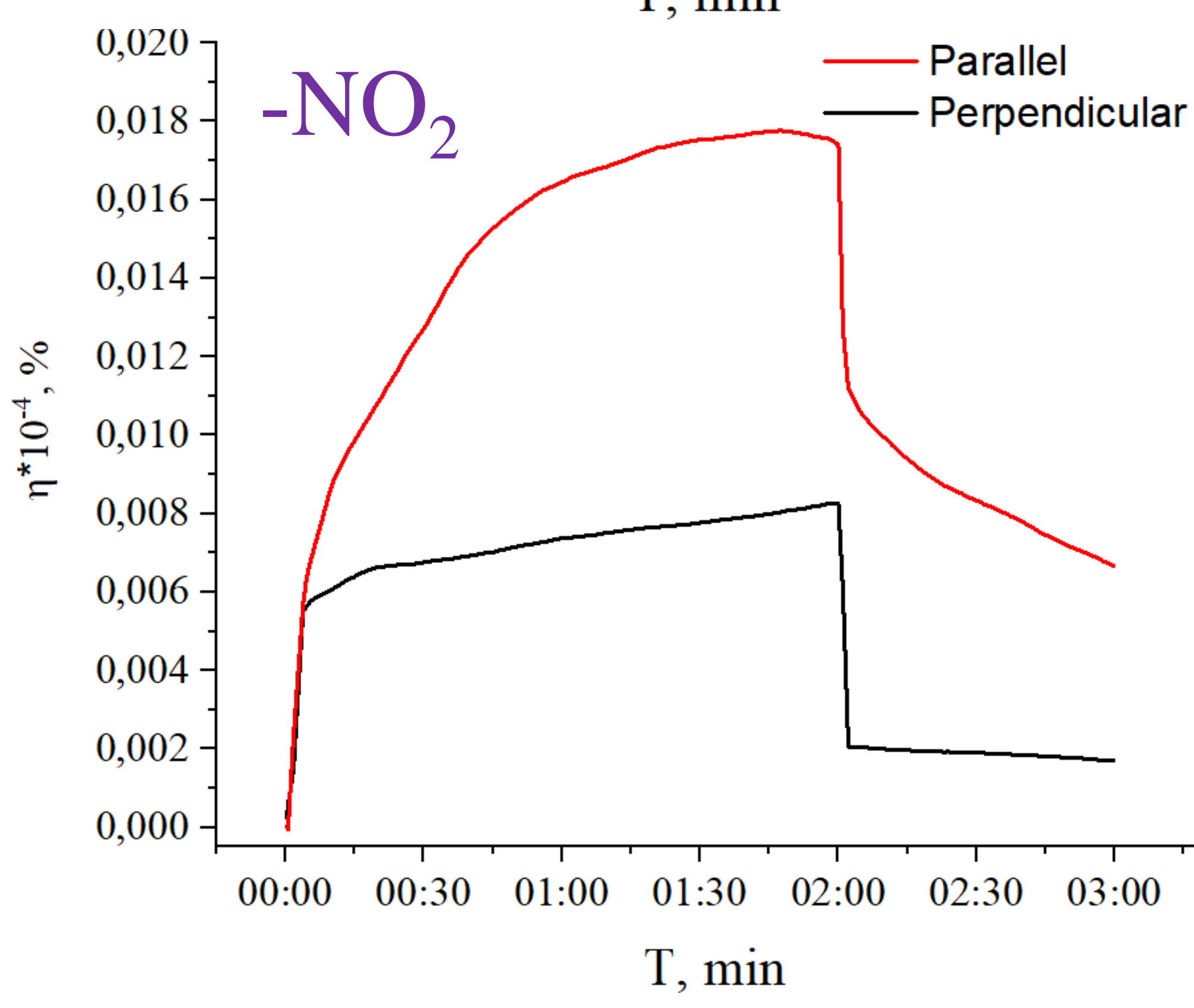
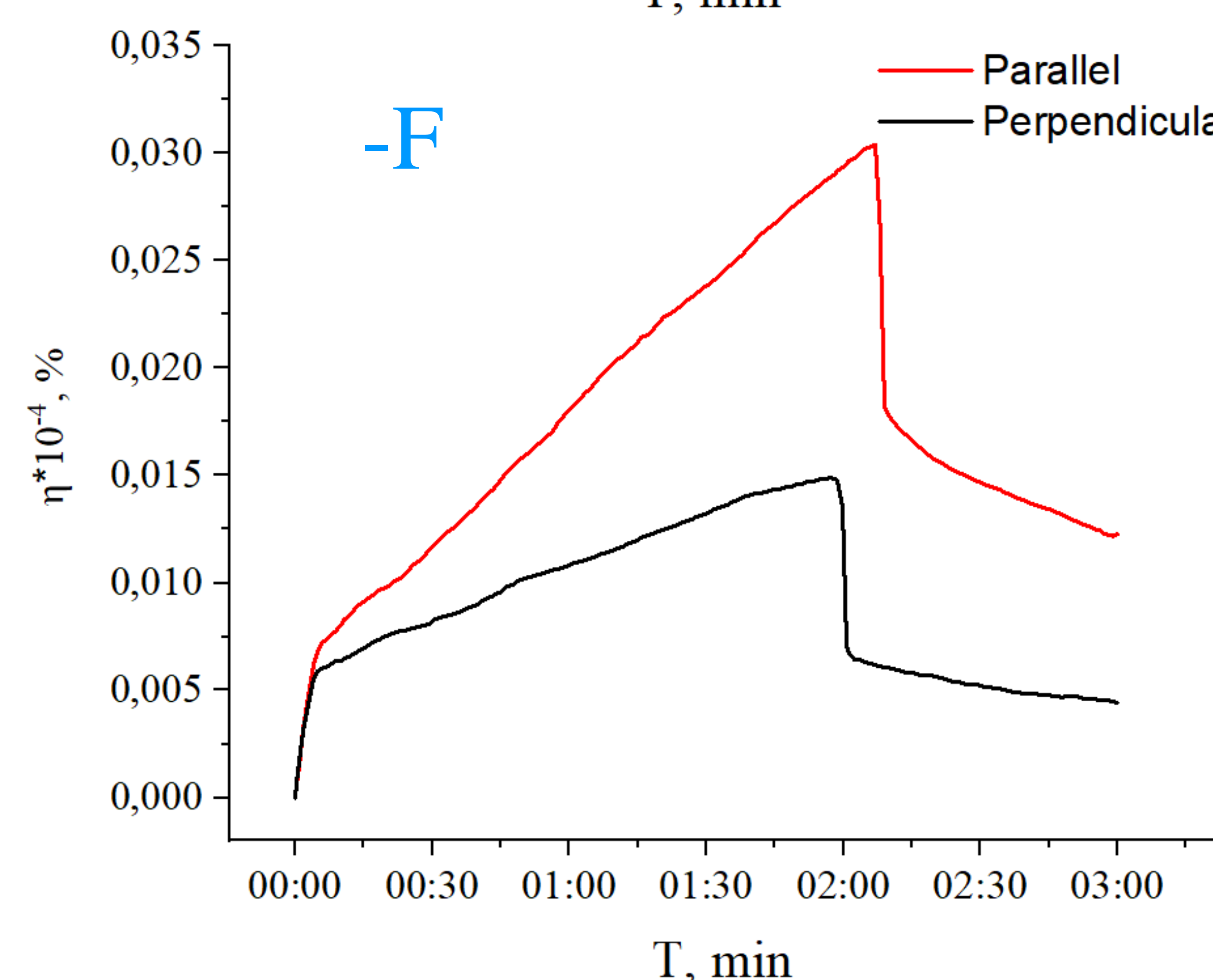
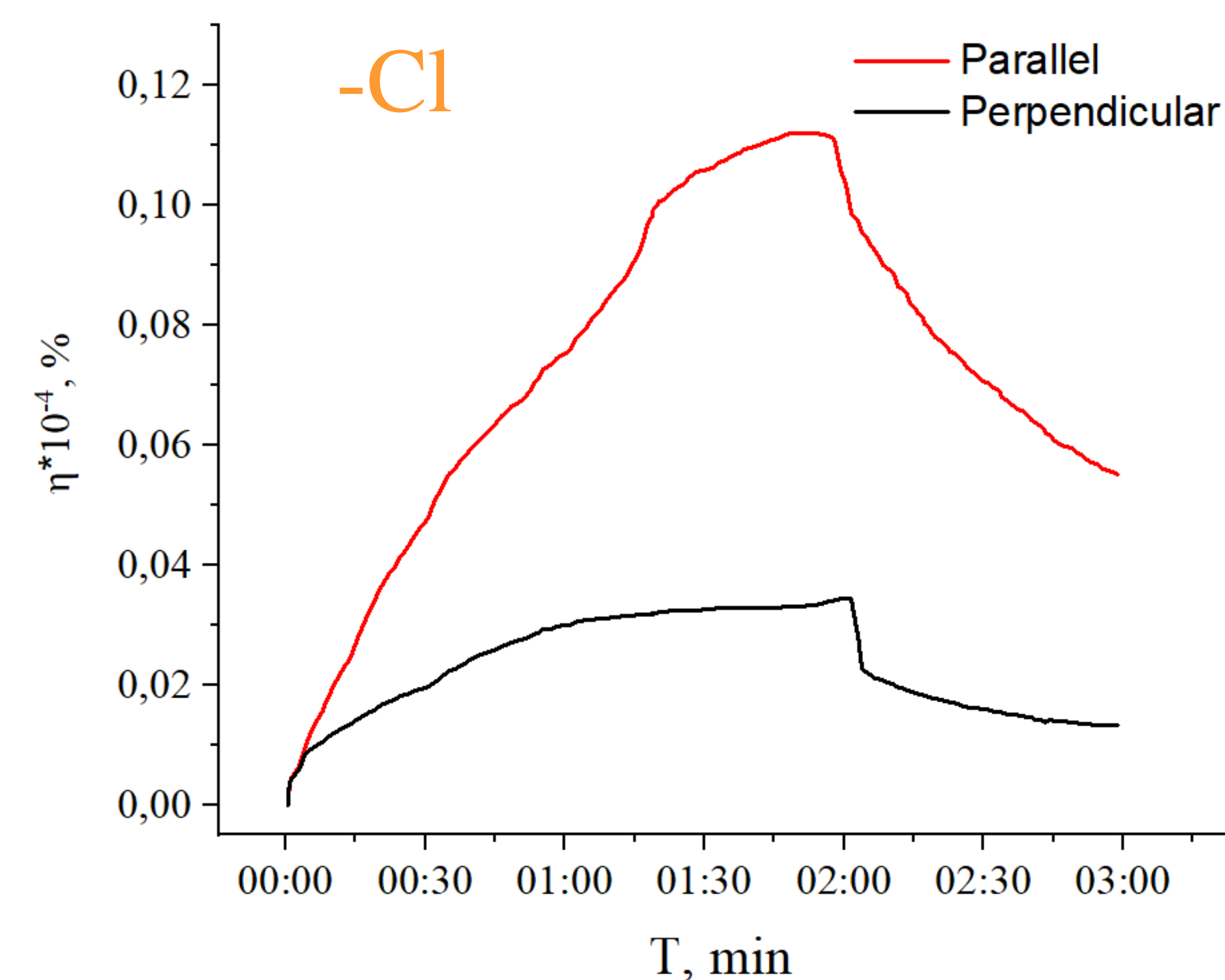
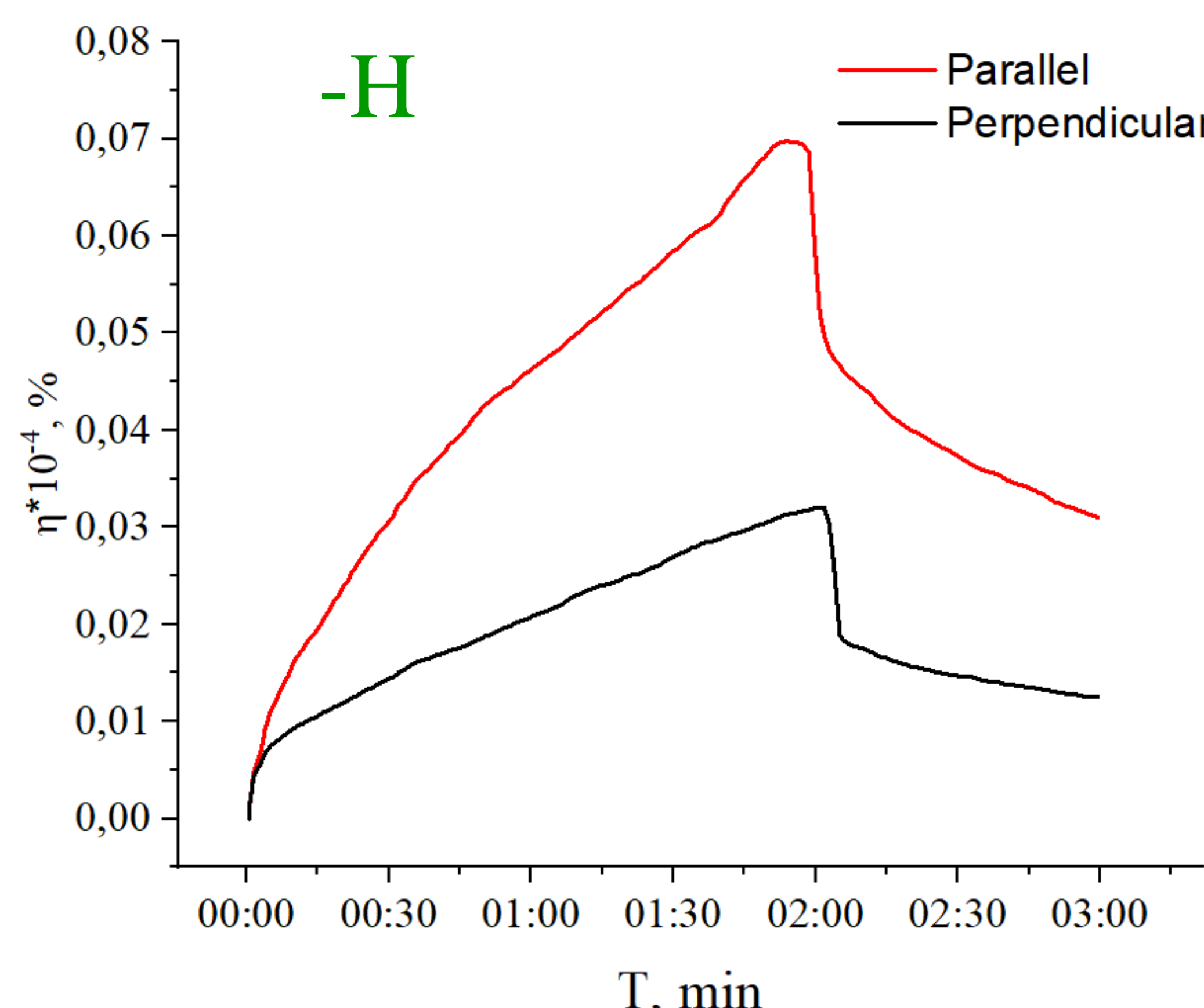
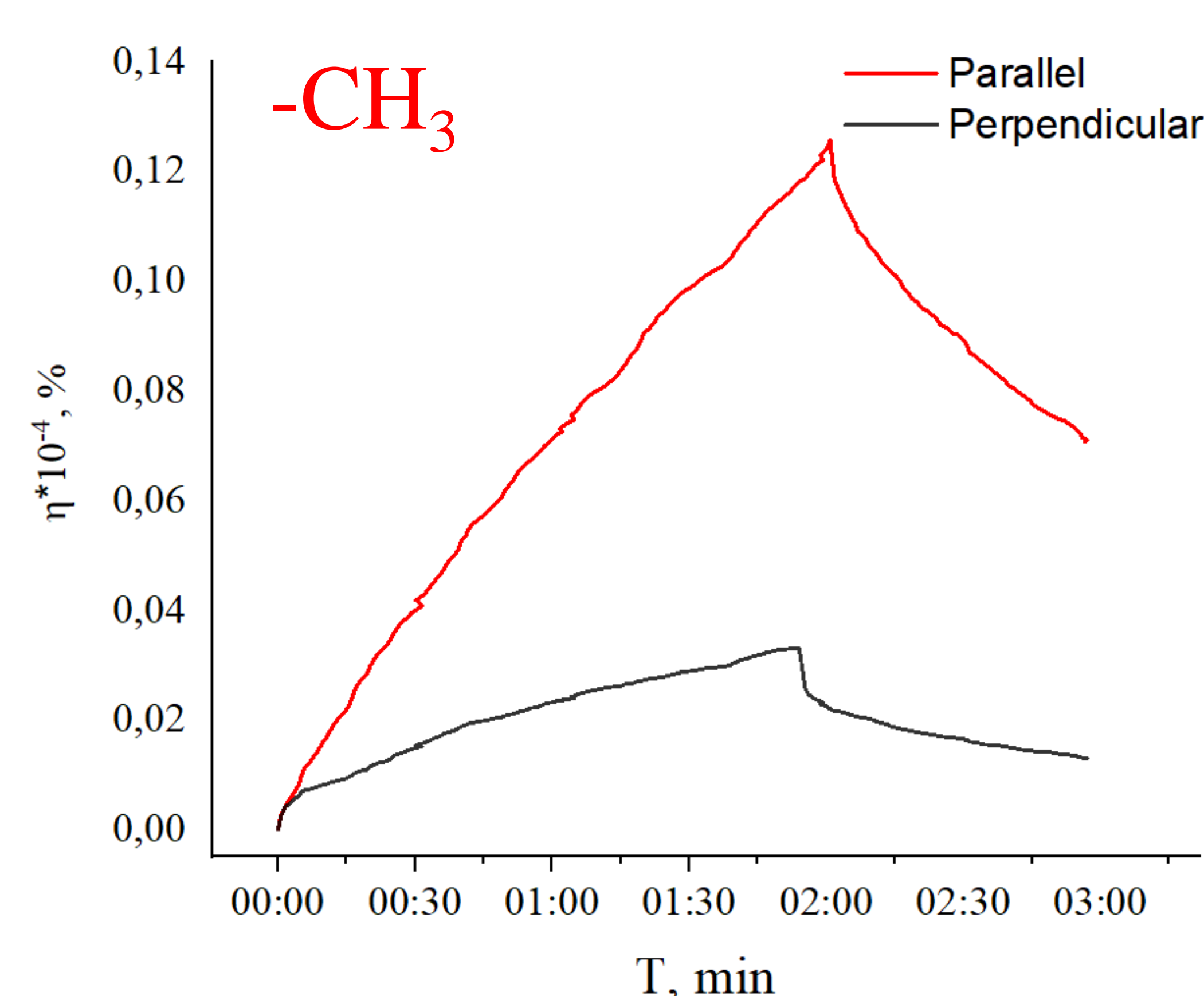
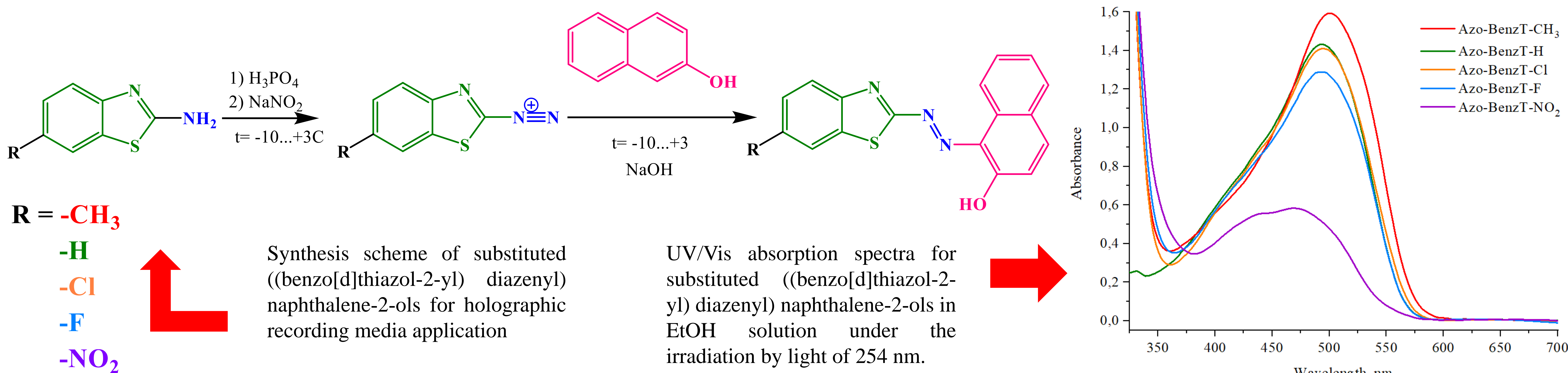
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Introduction

In recent decades, azo dyes based on various heterocyclic fragments have gained popularity among scientists. As they have a wide range of practical applications, for example, for dyeing fibers, photoelectronics, printing systems, optical data storage technologies [1], as textile dyes, they are also used in many biological reactions and in analytical chemistry [2].



Dependency of diffraction efficiency values for parallel and perpendicular orientations for compounds with different substitutes: (from left to right) -CH₃, -H, -Cl, -F, -NO₂.

compound	film						
	d, μm	η _⊥	η _∥	η _{max} [⊥]	η _{max} [∥]	t _{max} [⊥]	t _{max} [∥]
Azo-Btz-H	6.1	0.0325	0.0696	0.0389	0.1769	193 s	293 s
Azo-Btz-CH ₃	4.85	0.0337	0.1261	0.0404	0.1322	176 s	136 s
Azo-Btz-Cl	7	0.0355	0.1121	0.0334	0.1213	108 s	102 s
Azo-Btz-F	4	0.0150	0.0304				
Azo-Btz-NO ₂	5.45	0.0082	0.0177				



References

- Cojocariu, C., & Rochon, P. Synthesis and optical storage properties of a novel polymethacrylate with benzothiazole azo chromophore in the side chain // Journal of Materials Chemistry.-2004.-14(19).-P. 2909.
- Riaz, S., Ambreen, et al. Synthesis, characterization, solvatochromic study, and application of new heterocyclic monoazo acid dyes // Journal of Molecular Liquids.-2019.- P.110917.

Conclusions

- The obtained benzo[d]thiazol-2-yl) diazenyl) naphthalene-2-ols are characterized by higher values of diffraction efficiency for parallel polarization of the writing beam in comparison with the perpendicular one;
- The value of the diffraction efficiency decreases in the series -CH₃>-Cl >-H > -F > -NO₂, i.e. Going from donor substituents (-CH₃) to acceptor ones (-NO₂);
- All benzo[d]thiazol-2-yl) diazenyl) naphthalene-2-ols show residual diffraction efficiency when obstructing the object beam. In this case, for acceptor-containing molecules, the decline is sharper than for compounds with electron-donating substituents.