



## CURRICULUM VITAE

### ANATOLIY L. TATARETS

Ph.D. in Organic Chemistry

#### **Personal:**

Date and place of birth: January 16, 1979, Kharkiv, Ukraine  
Citizenship: Ukraine  
Affiliation: Head of Department of Luminescent Materials and Dyes named after B.M. Krasovitskiy  
Institute of Functional Materials Chemistry,  
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#### **Education:**

PhD in Organic Chemistry, State Scientific Institution "Institute for Single Crystals" of the National Academy of Sciences of Ukraine (2008), Ukraine.

M.Sc. in Chemical Technology of Organic Compounds, National Technical University "Kharkov Politechnical Institute", Technology of Organic Compounds Department (1999-2001), Ukraine.

Bachelor degree in Chemistry, National Technical University "Kharkiv Politechnical Institute", Technology of Organic Compounds Department (1995-1999), Ukraine.

#### **Professional Appointments:**

Head of Department of Luminescent Materials and Dyes, SSI "Institute for Single Crystals" of the National Academy of Sciences of Ukraine (Kharkiv) (October 2013 – present).

Senior Research Scientist, Department of Organic Luminophores and Dyes, SSI "Institute for Single Crystals" of the National Academy of Sciences of Ukraine (Kharkiv) (September 2012 – September 2013).

Research Scientist, Department of Organic Luminophores and Dyes, SSI "Institute for Single Crystals" of the National Academy of Sciences of Ukraine (Kharkiv) (October 2010 – August 2012).

Junior Research Scientist, Department of Organic Luminophores and Dyes, SSI "Institute for Single Crystals" of the National Academy of Sciences of Ukraine (Kharkiv) (July 2005 – September 2010).

Junior Research Scientist, Department of Organic Luminophores and Dyes, Institute for Scintillation Materials of the National Academy of Sciences of Ukraine (Kharkiv) (Nov. 2004 – June 2005)

Post Graduate Student, Institute for Single Crystals of the National Academy of Sciences of Ukraine (2001 – 2004).

Engineer, Institute for Single Crystals of the National Academy of Sciences of Ukraine (Kharkiv) (Oct. 2001 – Sep. 2001).

Engineer, Joint Venture "Amcrys-H, Ltd" (Kharkov, Ukraine) (June 2000 – Sep. 2001).

### **Scientific Background and Research Interests:**

- Fluorescence-based probes and labels for biomedical, pharmaceutical and environmental applications and life sciences: development and commercialization
- Materials for photodynamic therapy (PDT): development and application
- Development, investigation and application of organic dyes and luminophores.
- Development of photosensitizers and reporters for photodynamic therapy (PDT)
- Determination of photodynamic mechanisms
- Photochemistry and photobiochemistry of photosensitizers
- Organic and physical organic chemistry
- Synthesis and reactivity of organic compounds
- Molecular spectroscopy and fluorescence
- Molecular structure, conformational analysis, and intermolecular interaction
- Chemistry of cyanine and squaraine dyes

### **International Grants and Projects**

2021 – 2027 — Partner Project of Science and Technology Center in Ukraine (Grant No. P548b): *"Fluorescent Probes and Labels for Biomedical Applications"*.

2018 – 2021 — Partner Project of Science and Technology Center in Ukraine (Grant No. P548a): *"Fluorescent Probes and Labels for Biomedical Applications"*.

2012 – 2018 — Partner Project of Science and Technology Center in Ukraine (Grant No. P548): *"Fluorescent Probes and Labels for Biomedical Applications"*.

2012 – 2013 — Science and Technology Center in Ukraine Partner Project (Grant No. P542): *"High Quantum Efficiency Organic Dyes"*.

2009 – 2012 — Partner Project of Science and Technology Center in Ukraine (Grant No. P384): *"High Quantum Efficiency Organic Luminophores"*.

2007 – 2009 — Regular Project of Science and Technology Center in Ukraine (Grant No. 3804): *"Fluorescence Lifetime-based Probes and Labels for Biomedical Assays and Bacterial Pollution Monitoring"*.

2004 – 2006 — Regular Project of Science and Technology Center in Ukraine (Grant No. U111): *"Red and NIR Absorbing and Emitting Fluorescent Probes and Labels for Use in Biological and Biomedical Research"*.

### **Projects of National Research Foundation of Ukraine**

2020 – 2021 — NRFU competition "Science for the safety of human and society" *"Development of fluorescent diagnostic materials for hybridization assays and studies by polymerase chain reaction"* (Application ID: 2020.01/0516)

## Projects of National Academy of Sciences of Ukraine

- 2022 – 2024 — "Synthesis and investigation of halogen-containing polymethine dyes and luminophors"
- 2020 – 2021 — "Functional materials for biomedical purposes based on halogen-containing organic compounds"
- 2017 – 2021 — "The fundamental bases of creation of fluorescent organic dyes for medical diagnostics, display elements and photonic devices"
- 2016 – 2018 — "Energy transfer, quenching and fluorescence enhancement in multifluorophore systems"
- 2017 – 2018 — "Development of new dyes and fluorescent markers for fuel labeling"
- 2013 – 2015 — "Highly water-soluble, fluorescent cyanine and squaraine dyes"
- 2010 – 2012 — "Methods of synthesis and application of sensitive to the microenvironment organic luminophores – prototypes of biomedical probes and labels"
- 2007 – 2009 — "Synthesis and investigation of bis-polymethine dyes and luminophores based on benzodipyrroline"
- 2004 – 2006 — "Synthesis and Investigations of the Long-Wavelength Dyes and Luminophores"

## Honors

- "Talent, inspiration, work" honour of the National Academy of Sciences of Ukraine for young scientist (2008).
- Award "The best young scientist of Kharkiv region" in chemistry, Kharkiv Regional State Administration (2007).
- Scholarship of President of Ukraine (2002-2004).

## List of Selected Publications:

### Papers

1. O.Kulyk, O. Semenova, V. Ananieva, O. Zhikol, I. Omelchenko, A. Tatarets. Unravelling the Intricacies of Fluorescence Enhancement in Heptamethine Cyanine Dyes Induced by Heavy Halogen Atoms. // *Dyes and Pigments* – 2025. – V. 234. – 112548.
2. O. Kulyk, A. Krivoshey, O. Kolosova, I. Prylutska, T. Vasiliu, R. Puf, F. Mocci, A. Laaksonen, S. Perepelytsya, D. Kobzev, R. Svoiakov, Z. Tkachuk, A. Tatarets. Nucleic acid-binding bis-acridine orange dyes with improved properties for bioimaging and PCR applications. // *J. Mater. Chem. B* – 2024. – V. 82. – 11968–11982.
3. G. Pascual, S.K. Roy, G. Barcenas, Ch.K. Wilson, K. Cervantes-Salguero, O.M. Obukhova, A.I. Krivoshey, E.A. Terpetschnig, A.L. Tatarets, L. Li, B. Yurke, W.B. Knowlton, O.A. Mass, R.D. Pensack, J. Lee. Effect of hydrophilicity-imparting substituents on exciton delocalization in squaraine dye aggregates covalently templated to DNA Holliday junctions. // *Nanoscale* – 2024. – V. 16. – 1206–1222.
4. D. Kobzev, O. Semenova, A. Tatarets, A. Bazylevich, G. Gellerman, L. Patsenker. Antibody-guided iodinated cyanine for near-IR photoimmunotherapy. // *Dyes and Pigments* – 2023. – V. 212. – 111101.
5. R.P. Svoiakov, O.G. Kulyk, I.V. Hovor, S.V. Shishkina, A.L. Tatarets. Environment-sensitive indolenine-based hemisquaraine dyes: Synthesis, molecular structure, and spectral properties. // *Dyes and Pigments* – 2023. – V. 219. – 111612.
6. O.A. Mass, Sh. Basu, L.K. Patten, E.A. Terpetschnig, A.I. Krivoshey, A.L. Tatarets, R.D. Pensack, B. Yurke, W.B. Knowlton, J. Lee. Exciton Chirality Inversion in Dye Dimers

- Templated by DNA Holliday Junction. // *J. Phys. Chem. Lett.* – 2022. – V. 13. – 10688–10696.
7. M.S. Barclay, Ch.K. Wilson, S.K. Roy, O.A. Mass, O.M. Obukhova, R.P. Svoiakov, A.L. Tatarets, A.U. Chowdhury, J.S. Huff, D.B. Turner, P.H. Davis, E.A. Terpetschnig, B. Yurke, W.B. Knowlton, J. Lee, R.D. Pensack. Oblique packing and tunable excitonic coupling in DNA-templated squaraine rotaxane dimer aggregates. // *ChemPhotoChem* – 2022. – V. 6, Iss. 7. – e202200039.
  8. O.G. Kulyk, O.S. Kolosova, R.P. Svoiakov, D.V. Kobzev, I.V. Hovor, I.M. Kraievska, E.V. Sanin, A.I. Krivoshey, Z.Yu. Tkachuk, A.L. Tatarets. Novel dimeric dyes based on the acridine orange chromophore: Synthesis, characterization and application in real-time PCR. // *Dyes and Pigment* – 2022. – V. 200. – 110148.
  9. G. Barcenas, A. Biaggne, O.A. Mass, Ch.K. Wilson, O.M. Obukhova, O.S. Kolosova, A.L. Tatarets, E. Terpetschnig, R.D. Pensack, J. Lee, W.B. Knowlton, B. Yurke, Lan Li. First-principles studies of substituent effects on squaraine dyes. // *RSC Adv.* – 2021. – V. 11. – 19029-19040.
  10. O.K. Farat, I.V. Ananyev, A.L. Tatarets, S.A. Varenichenko, E.V. Zaloznaya, V.I. Markov. Influence of the amidine fragment on spectral properties of xanthene dyes. // *J. Mol. Struct.* – 2021. – V. 1224. – 129191.
  11. O.S. Kolosova, S.V. Shishkina, V. Marks, G. Gellerman, I.V. Hovor, A.L. Tatarets, E.A. Terpetschnig, L.D. Patsenker. Molecular structure and spectral properties of indolenine based norsquaraines versus squaraines. // *Dyes and Pigments* – 2019. – V. 163. – P. 318–329.
  12. I.V. Hovor, O.S. Kolosova, E.V. Sanin, O.M. Obukhova, A.L. Tatarets, E.A. Terpetschnig, L.D. Patsenker. Water-soluble norsquaraine dyes for protein labeling and pH-sensing applications // *Dyes and Pigments* – 2019. – V. 170. – 107567.
  13. O.K. Farat, I.V. Ananyev, S.A. Varenichenko, A.L. Tatarets, V.I. Markov. Vilsmeier-Haack reagent: An efficient reagent for the transformation of substituted 1,3-naphthoxazines into xanthene-type dyes. // *Tetrahedron* – 2019. – V. 75. – P. 2832–2842.
  14. O.K. Farat, S.A. Farat, A.L. Tatarets, A.V. Mazepa, V.I. Markov. Synthesis and spectral properties of new xanthene chromophores. // *Journal of Molecular Structure* – 2019. – V. 1176. – P. 567–575.
  15. O.K. Farat, S.A. Farat, I.V. Ananyev, S.I. Okovytyy, A.L. Tatarets, V.I. Markov. Novel xanthene *push-pull* chromophores and luminophores: Synthesis and study of their spectral properties // *Tetrahedron* – 2017. – V. 73, Iss. 51. – P. 7159–7168.
  16. I.V. Govor, A.L. Tatarets, O.M. Obukhova, E.A. Terpetschnig, G. Gellerman, L.D. Patsenker. Tracing the conformational changes in BSA using FRET with environmentally-sensitive squaraine probes. // *Methods Appl. Fluoresc.* – 2016. – V. 4. – 024007.
  17. T.V. Shkand, M.O. Chizh, I.V. Sleta, B.P. Sandomirsky, A.L. Tatarets, L.D. Patsenker. Assessment of alginate hydrogel degradation in biological tissue using viscosity-sensitive fluorescent dyes. // *Methods Appl. Fluoresc.* – 2016. – V. 4. – 044002.
  18. M. Collot, R. Kreder, A.L. Tatarets, L.D. Patsenker, Y. Mely, A.S. Klymchenko. Bright fluorogenic squaraines with tuned cell entry for selective imaging of plasma membrane vs. endoplasmic reticulum // *Chem. Commun.* – 2015. – V. 51. – P. 17136–17139.
  19. L.D. Patsenker, A.L. Tatarets, Ye.A. Povrozin, E.A. Terpetschnig. Long-wavelength fluorescence lifetime labels. // *Bioanal. Rev.* – 2011. – V. 3 – P. 115–137.
  20. Patsenker L.D., Tatarets A.L., Terpetschnig E.A. Long-Wavelength Probes and Labels Based on Cyanines and Squaraines. In *Springer Series on Fluorescence, Vol. 8: "Advanced Fluorescence Reporters in Chemistry and Biology I"*. Vol. Ed. A. Demchenko, Ser. Ed. O.S. Wolfbeis. Springer Verlag, 2010 – 390 p. – P. 65–104.
  21. Patsenker L.D., Tatarets A.L., Klochko O.P., Terpetschnig E.A. Conjugates, complexes and interlocked systems based on squaraines and cyanines. In *Springer Series on Fluorescence, Vol. 9: "Advanced Fluorescence Reporters in Chemistry and Biology II"*. Vol. Ed. A. Demchenko, Ser. Ed. O.S. Wolfbeis. Springer Verlag, 2010 – 440 p. – P. 159–190.

22. Trusova V.M., Gorbenko G.P., Sarkar P., Luchowski R., Akopova I., Patsenker L.D., Klochko O., Tatarets A.L., Kudriavtseva Yu.O., Terpetschnig E.A., Gryczynski I., Gryczynski Z. Förster Resonance Energy Transfer Evidence for Lysozyme Oligomerization in Lipid Environment // *J. Phys. Chem. B.* – 2010. – Vol. 114. – P. 16773–16782.
23. Povrozin Ye.A., Kolosova O.S., Obukhova O.M., Tatarets A.L., Sidorov V.I., Terpetschnig E.A., Patsenker L.D. Seta-633 - A NIR Fluorescence Lifetime Label for Low-Molecular-Weight Analytes // *Bioconjugate Chem.* – 2009. – Vol. 20. – P. 1807–1812.
24. Povrozin Ye.A., Markova L.I., Tatarets A.L., Sidorov V.I., Terpetschnig E.A., Patsenker L.D. Dual Ratiometric NIR Fluorescent Label For Measurement of pH // *Analytical Biochemistry.* – 2009. – Vol. 390. – P.136–140.
25. Patsenker L., Tatarets A., Kolosova O., Obukhova O., Povrozin Ye., Fedyunyayeva I., Yermolenko I., Terpetschnig E. Fluorescent probes and labels for biomedical applications // *Ann. New York Acad. Sci.* – 2008. – Vol. 1130. – P. 179–187.
26. Ioffe V.M., Gorbenko G.P., Kinnunen P.K.J., Tatarets A.L., Kolosova O.S., Patsenker L.D., Terpetschnig E.A., Dyubko T.S. Tracing lysozyme-lipid interaction with long-wavelength squaraine dyes. // *J. Fluoresc.* – 2007. – Vol. 17, No. 1. – P. 65–72.
27. Volkova K.D., Kovalska V.B., Tatarets A.L., Patsenker L.D., Kryvorotenko D.V., Yarmoluk S.M. Spectroscopic study of squaraines as protein-sensitive fluorescent dyes // *Dyes and Pigments.* – 2007. – Vol. 72, Iss. 3. – P. 285–292.
28. Ioffe V.M., Gorbenko G.P., Tatarets A.L., Patsenker L.D., Terpetschnig E.A. Examining protein-lipid interactions in model systems with a new squarylium fluorescent dye // *J. Fluoresc.* – 2006. – Vol. 16, No. 4. – P. 547–554.
29. Ioffe V.M., Gorbenko G.P., Domanov Ye.A., Tatarets A.L., Patsenker L.D., Terpetschnig E.A., Dyubko T.S. A new fluorescent squaraine probe for the measurement of membrane polarity // *J. Fluoresc.* – 2006. – Vol. 16, No. 1. – P. 47–52.
30. Nizomov N., Ismailov Z.F., Nizomov Sh.N., Salakhitdinova M.K., Tatarets A.L., Patsenker L.D., Khodjayev G. Spectral-luminescent study of interaction of squaraine dyes with biological substances // *J. Mol. Struct.* – 2006. – Vol. 788, Iss. 1–3. – P. 36–42.
31. Tatarets A.L., Fedyunyayeva I.A., Dyubko T.S., Povrozin Ye.A., Doroshenko A.O., Terpetschnig E.A., Patsenker L.D. Synthesis of water-soluble, ring-substituted squaraine dyes and their evaluation as fluorescent probes and labels // *Anal. Chim. Acta.* – 2006. – Vol. 570, Iss. 2. – P. 214–223.
32. Shishkina S.V., Baumer V.N., Shishkin O.V., Tatarets A.L., Patsenker L.D. Molecular and Crystal Structure of 3-Butoxy-4-(1,3,3-trimethyl-2,3-dihydro-1*H*-2-indolylidenemethyl)-3-cyclobutene-1,2-dione and its Thio Analog // *J. Struct. Chem.* – 2005. – Vol. 46, No. 1. – P. 154–158.
33. Tatarets A.L., Fedyunyaeva I.A., Terpetschnig E., Patsenker L.D. Synthesis of novel squaraine dyes and their intermediates // *Dyes and Pigments.* – 2005. – Vol. 64, No. 2. – P. 125–134.
34. Zubatyuk R.I., Baumer V.N., Tatarets A.L., Patsenker L.D., Shishkin O.V. 4-Dimethylaminopyridinium 2-butoxy-3-dicyanomethylene-4-oxo-1-cyclobuten-1-olate // *Acta Crystallogr. Section E.* – 2004. – Vol. 60. – P. o2252–o2254.

#### *Patents*

1. Terpetschnig E.A., Patsenker L., Tatarets A., Fedyunyaeva I., Borovoy I., Dyes and fluorescent compounds, PCT Patent No. WO 03/087052 (23.10.2003).
2. Terpetschnig E.A., Patsenker L.D., Tatarets A. Luminescent compounds, US Patent Application No. US 2004/0166515 (26.08.2004).
3. Terpetschnig E.A., Tatarets A., Galkina O., Fedyunyaeva I., Patsenker L. Luminescent Compounds, US 2005/0202565 (15.09.2005).

4. Terpetschnig E.A., Patsenker L.D., Tatarets A.L. Luminescent compounds, US 7,250,517 B2 (31.07.2007).
5. Terpetschnig E.A., Tatarets A., Galkina O., Fedyunyayeva I., Patsenker L., Luminescent Compounds, US 7,411,068 B2 (12.08.2008).
6. Terpetschnig E.A., Patsenker L.D., Markova L.I., Fedyunyayeva I.A., Kolosova O.S., Starko S., Tatarets A. Luminescent compounds. WO 2010/083471 (22.07.2010).
7. Terpetschnig A.E., Patsenker L.D., Klochko O., Kudriavtseva Yu., Tatarets A.L., Yermolenko I.G., Povrozin Ye.A. Luminescent compounds. US 2010/0266507 A1 (21.10.2010).
8. Terpetschnig E.A., Patsenker L.D., Markova L., Fedyunyaeva I.A., Kolosova O.S., Starko S., Tatarets A. Luminescent compounds. US 8,552,027 B2 (08.10.2013).
9. Terpetschnig E.A., Patsenker L.D., Klochko O., Kudriavtseva Yu., Tatarets A.L., Yermolenko I.G., Povrozin Ye.A. US 8,642,014 B2 (04.02.2014).
10. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated Compounds for Photodynamic Therapy. US 8,748,446 B2 (10.06.2014).
11. Terpetschnig E.A., Patsenker L.D., Klochko O., Kudryavtseva Yu., Tatarets A., Yermolenko I., Povrozin Ye. Luminescent compounds. EP 2129788 B1 (03.09.2014).
12. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated Compounds for Photodynamic Therapy. US 8,962,797 B2 (24.02.2015).
13. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated Compounds for Photodynamic Therapy. EP 2850061 A2 (25.03.2015).
14. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated Compounds for Photodynamic Therapy. US 9,040,721 B2 (26.05.2015).
15. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated Compounds for Photodynamic Therapy. US 9,095,612 B2 (04.08.2015).
16. Terpetschnig E.A., Patsenker L.D., Markova L., Fedyunyaeva I.A., Kolosova O.S., Obukhova O.M., Tatarets A. Luminescent compounds. US 9,110,069 B2 (18.08.2015).
17. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated Compounds for Photodynamic Therapy. US 9,572,881 B2 (21.02.2017).
18. Shkand T.V., Chyzh M.O., Sleta I.V., Tatarets A.L., Roshal O.D., Patsenker L.D., Sandomyrskiy B.P., Terpetschnig E.A. Viscosity-Sensitive Dyes and Method. US 9,841,428 B2 (12.12.2017).
19. Kobzev D.V., Kolosova O.S., Obukhova O.M., Semenova O.M., Svoyakov R.P., Tatarets A.L., Terpetschnig E.A. Luminescent squaraine rotaxane compounds. US 2019/0048196 A1 (14.02.2019).
20. Jones G.W., Tatarets A.L., Patsenker L.D. Halogenated indole derivatives for photodynamic therapy. EP2850061 B1 (16.09.2020).
21. Kobzev D.V., Kolosova O.S., Obukhova O.M., Semenova O.M., Svoyakov R.P., Tatarets A.L., Terpetschnig E.A. Luminescent squaraine rotaxane compounds. US 11091646 (17.08.2021).