

Division of Molecular Biophysics

Topics currently covered by **Jacek Gapiński**:





- Diffusion in living cells (CNBM, CZT)
- Charged colloids – experiments (DLS, SLS, FCS), numerical calculations (Ornstein-Zernicke models), analysis of MC computer simulations (Sebastian Wołoszczuk)
- Experimental studies of relaxation processes in supercooled liquids (DLS, FCS, BLS)
- Analysis of molecular dynamics simulations (Koperwas, Katowice) of model (artificial) molecules in supercooled state

Most of these topics are realized in close cooperation with prof. Adam Patkowski

Division of Molecular Biophysics

Topics currently covered by Jacek Gapiński:

Nanomolar Nitric Oxide Concentrations in Living Cells Measured by Means of Fluorescence Correlation Spectroscopy

by Roksana Markiewicz 1,* ✉ , Jagoda Litowczenko 1,* ✉ , Jacek Gapiński 2 ✉ , Anna Woźniak 1,3 ✉, Stefan Jurga 1 ✉  and Adam Patkowski 1,2 ✉

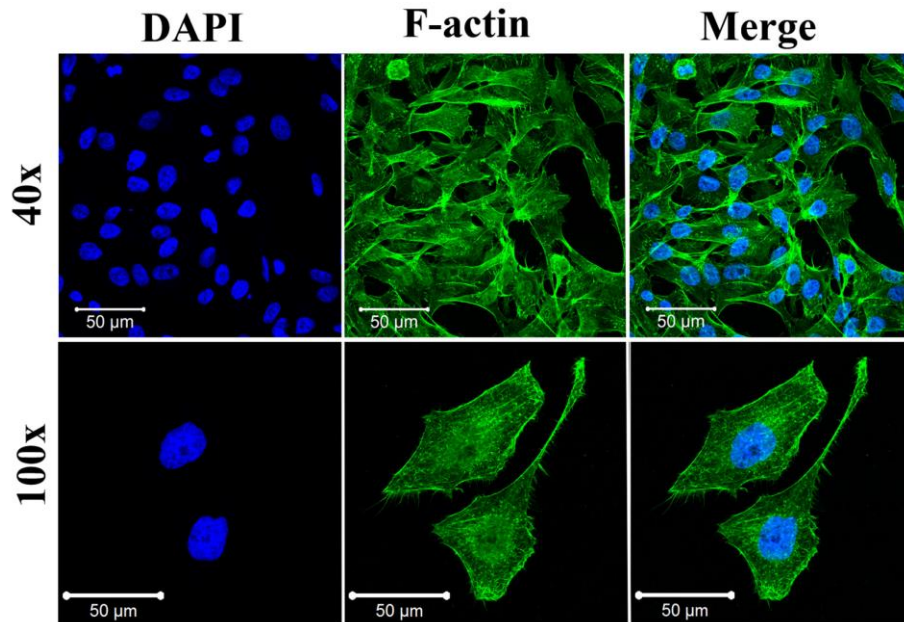


Figure 8. Correlation functions measured in the cytoplasm of an HUVEC cell at 10, 20, and 25 min, after adding the DAF-2DA dye (100 nM) to the cell-surrounding medium.

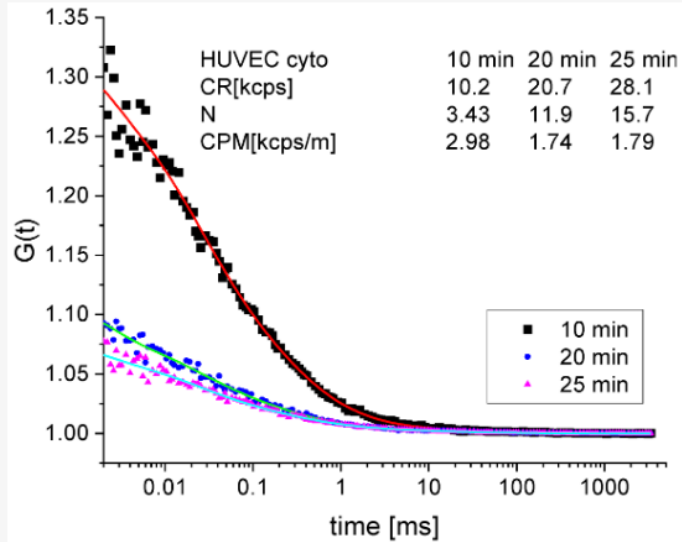


Figure 10. Time dependence of (a) the fluorescence intensity and (b) the number of fluorescing dye molecules measured in the HeLa cytoplasm after adding GSNO to the DAF-2 containing HeLa cells.

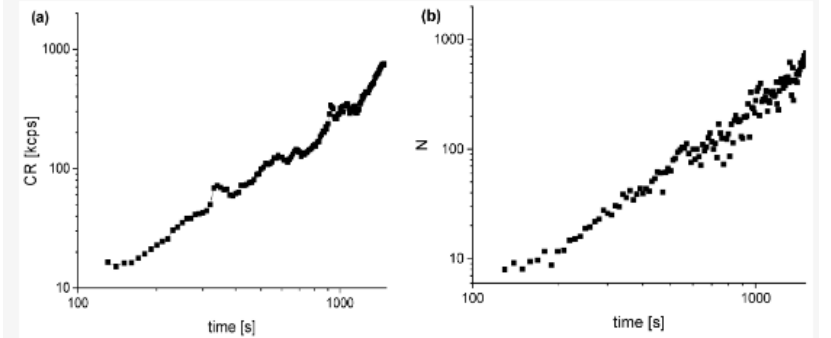
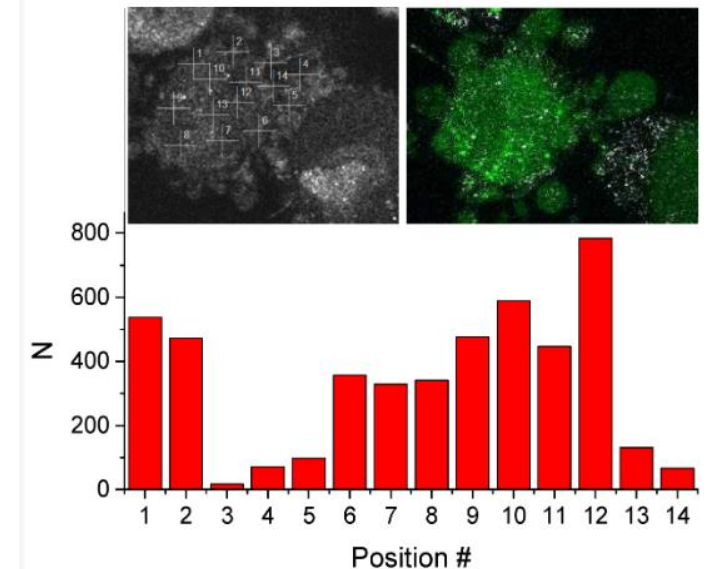


Figure 11. Parameter N values measured in different positions in the HeLa cell. Inset left shows the positions; inset right shows the confocal scan of the cell in the fluorescence mode.



Division of Molecular Biophysics

Topics currently covered by Jacek Gapiński:

Experimental examination of dipole-dipole cross-correlations by dielectric spectroscopy, depolarized dynamic light scattering, and computer simulations of molecular dynamics

K. Koperwas, J. Gapiński, Z. Wojnarowska, A. Patkowski, and M. Paluch
 Phys. Rev. E **109**, 034608 – Published 21 March 2024

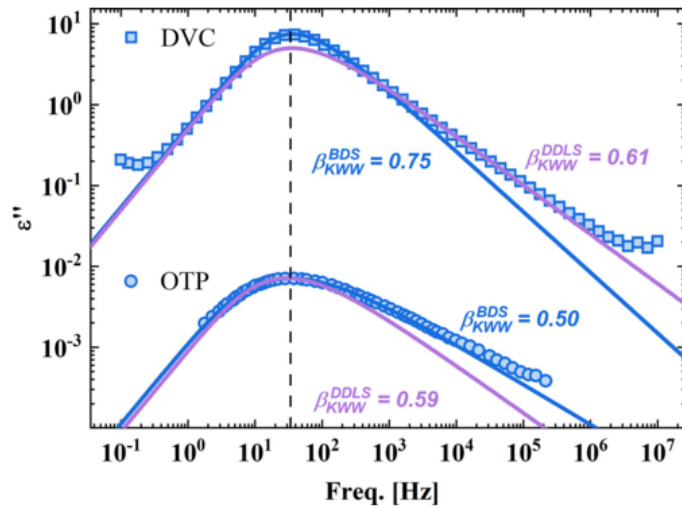


Figure 4

The loss part of the dielectric spectra measured at the temperature equal to 258 and 266 K for OTP and DVC, respectively. The blue lines are the fits of the KWW function to BDS data. The violet lines represent the DDLS susceptibility results. Data for OTP were taken from Refs. [20, 21, 22, 23].

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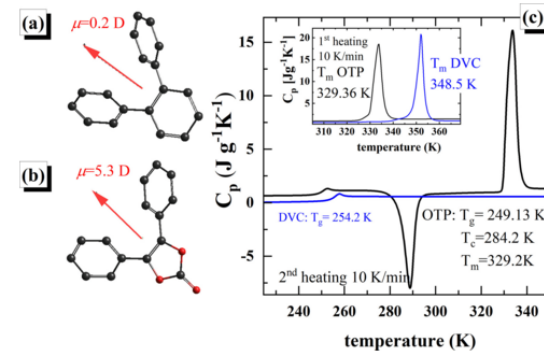


Figure 2

Panels (a) and (b) depict the molecular structures of OTP and DVC, respectively. The red arrows indicate the direction of the dipole moment. Panel (c) presents the thermograms of both studied glass formers. In the inset, the initial heating of the crystallized sample T_g is presented for OTP and DVC.

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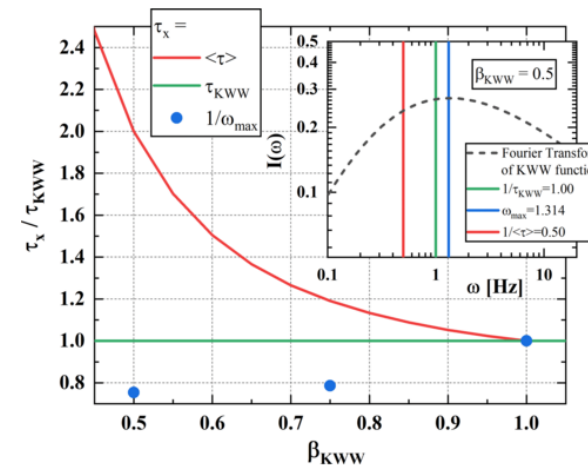


Figure 1

Mutual dependencies of $\langle \tau \rangle$, τ_{KWW} , and $1/\omega_{max}$ for processes described by KWW correlation functions characterized by different β_{KWW} values. Inset: Shape of the dielectric loss spectrum for a process characterized by KWW correlation functions with $\beta_{KWW} = 0.5$ with lines indicating ω_{max} and reciprocal values of $\langle \tau \rangle$ and τ_{KWW} .

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