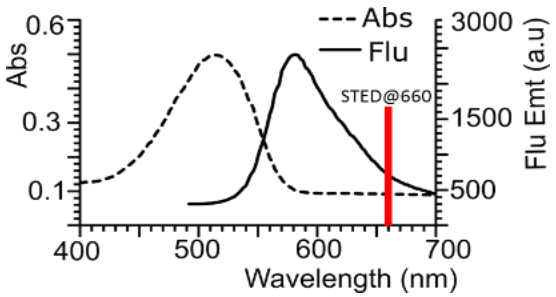
High-Redshift BODIPY Dyes

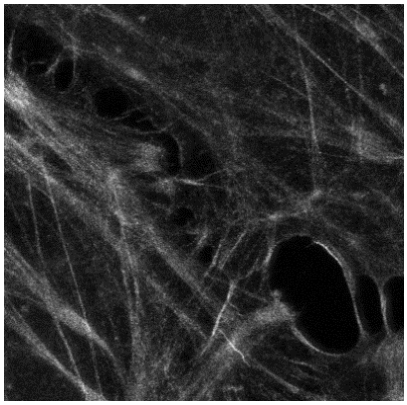
High-Redshift BODIPY Dyes for 2-Photon Imaging

Invention

Fluorescent molecules are widely used in bioimaging and medicinal applications for several decades due to their high sensitivity and easy visibility. 4,4-Difluoro-4-bora-3a,4a-diaza-s-indacene (BODIPY) dyes are a class of organic fluorescence dyes noted for their high photostability, sharp absorption and emission bands, excitation and emission wavelengths in the visible/near infrared region, high fluorescence quantum yield, high photostability and resistance to chemical degradation. BODIPY compounds fulfil the rigorous requirements for bio-imaging, yet, the inherently small Stokes shift, mostly below 20 nm, limits the applications of BODIPY compounds especially in super-resolution imaging. The inventors of the present invention set out to improve the stokes shift while maintaining the other favourable properties of BODIPY compounds. They came up with an improved scaffold that offers a very high redshift. These dyes are in particular useful in 2-photon imaging experiments. STED-imaging at 660 nm is enormously facilited emplying these dyes. Typical data characterizing the dyes are λ(abs)=512 nm, λ(em)=580 nm and a quantum yield of 0.66.



Spectral characteristics of high-redshift BODIPY dyes. Typical data are: λ(abs)=512 nm, λ(em)=580 nm and a quantum yield of 0.66, lifetime: 3.34 nsec



Imaging actins with ABDP512 @ STED 660 nm

Competitive Advantages

- Easy synthetical access
- High redshift (Stokes shift)
- Photostable
- High quantum yield
- Non-toxic

Technology Readiness Level

1 2 3 4 5 6 7 8 9

System prototype demonstration in operational environment

Industries

- Biomolecular imaging
- Assay development

Ref. No.

4986

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Commercial Opportunities

The invention is available for outlicensing or co-development.

Current Status

A PCT application has been filed; PCT/EP2019/084763.

An invention of RWTH Aachen and University Hospital Aachen.

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