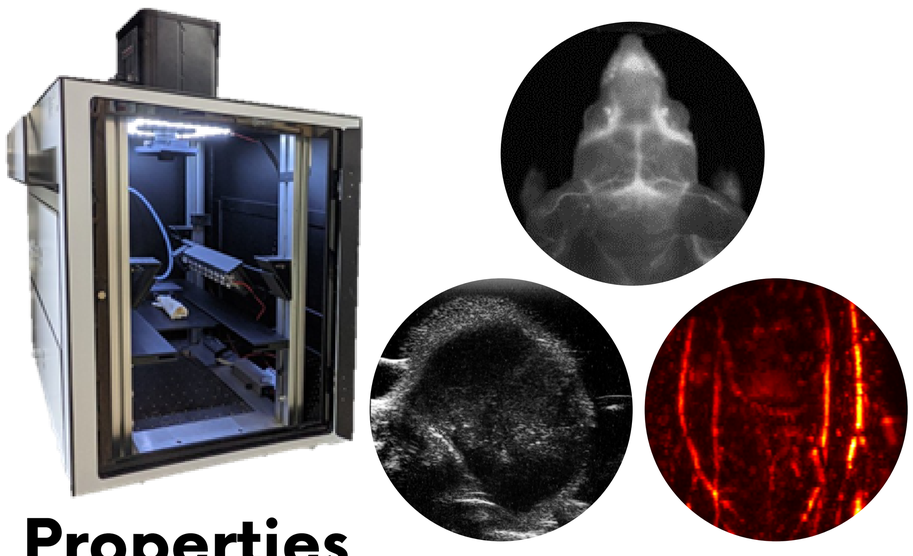
奈米科技創新應用計畫研發成果

開發尖端NIR-II Nano-Pdots奈米複合藥物與建構螢光+光聲+超音波多模3D小動物腫瘤影像與光熱治療系統(2/3)

國立陽明交通大學 NATIONAL YANG MING CHIAO TUNG UNIVERSITY

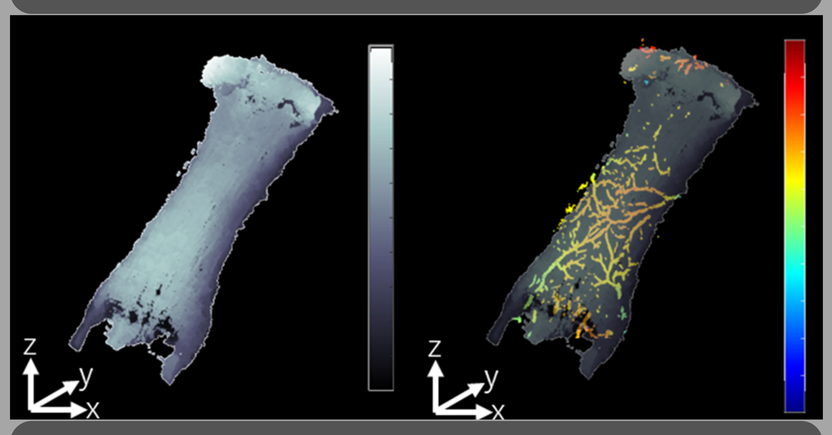
NIR-II multi-modality FL+US+PA imaging system



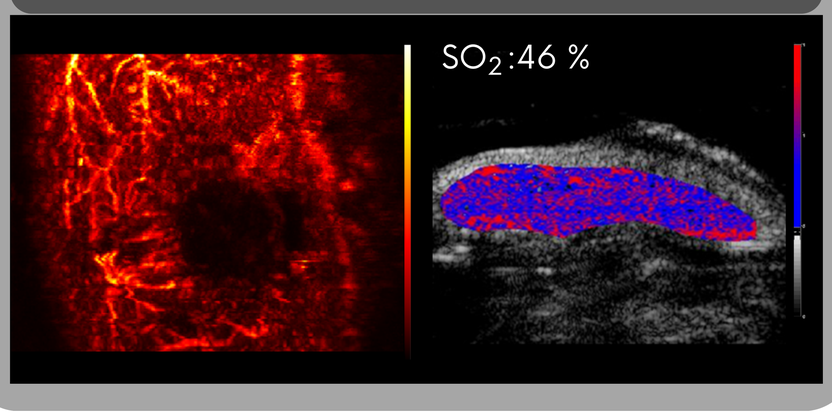
Properties

- NIR-II imaging (1000-1700 nm)
- High penetration depth (5-10 mm)
- Non-ionizing & non-invasive

NIR-II 3D contour & vascular imaging

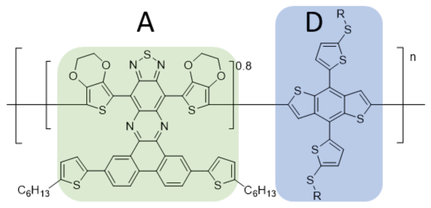


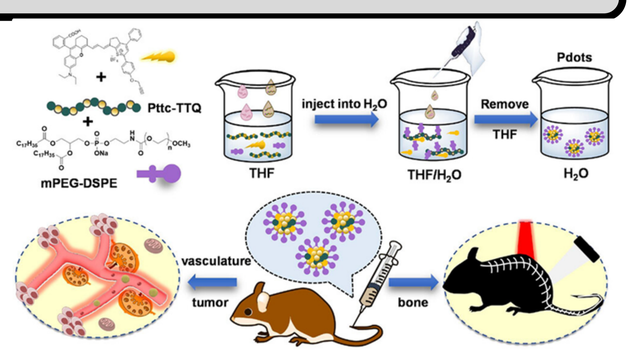
Photoacoustic (PA) oxygen imaging



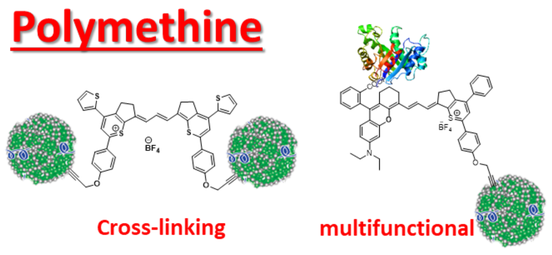
Nano-Pdots for tumor and bone imaging

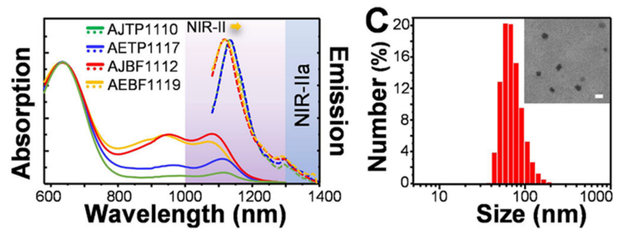
D-A-D Polymers

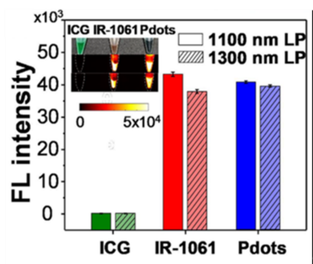


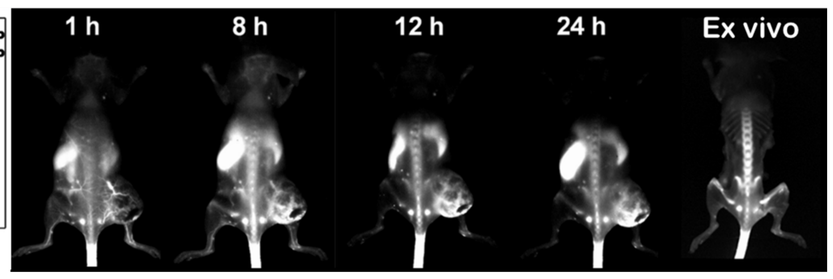


Polymethine

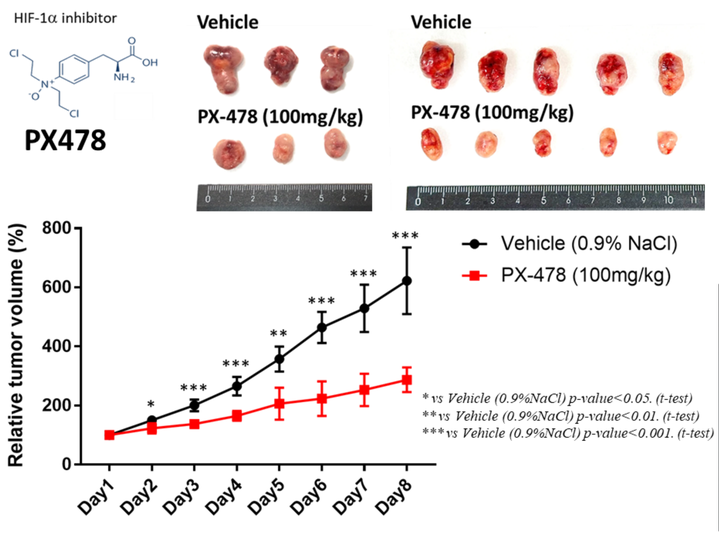


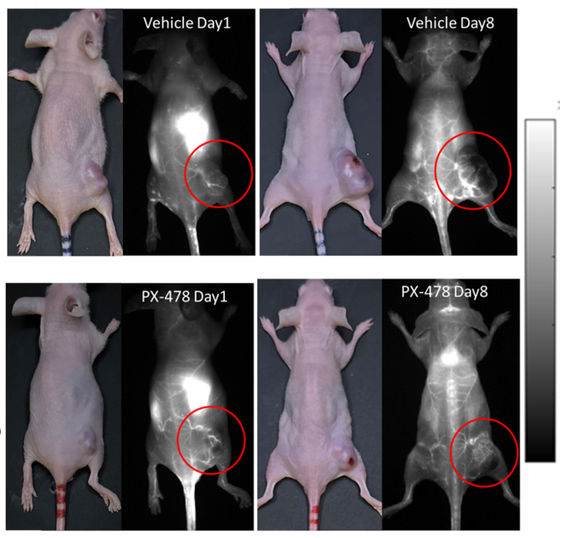






Nano-Pdots for tumor theranostics





Award

- **2022 未來科技獎**
- 2022 JMBE Annual Excellent Paper Award
- 2022 SPIE Conference Paper Award

Publications

- Adv. Healthc. Mater., 2021, "Molecular Design of Ultrabright Semiconducting Polymer Dots with High NIR-II Fluorescence for 3D Tumor Mapping"
- Biosensors, 2022, "Development of Stereo NIR-II Fluorescence Imaging System for 3D Tumor Vasculature in Small Animals"
- J. Med. Biol. Eng., 2022, "Theranostic Radiolabeled Nanomaterials for Molecular Imaging and Potential Immunomodulation Effects"
- Chem. Sci., 2022, "TADF-based NIR-II semiconducting polymer dots for in vivo 3D bone imaging"
- J. Am. Chem. Soc., 2023, "Rational Design of Asymmetric Polymethines to Attain NIR(II) Bioimaging at >1100 nm"
- J. Biomed. Opt., 2023, accepted "Realization of NIR-II 3D whole-body contour and tumor blood vessels imaging in small animals using rotational stereo vision technique.

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