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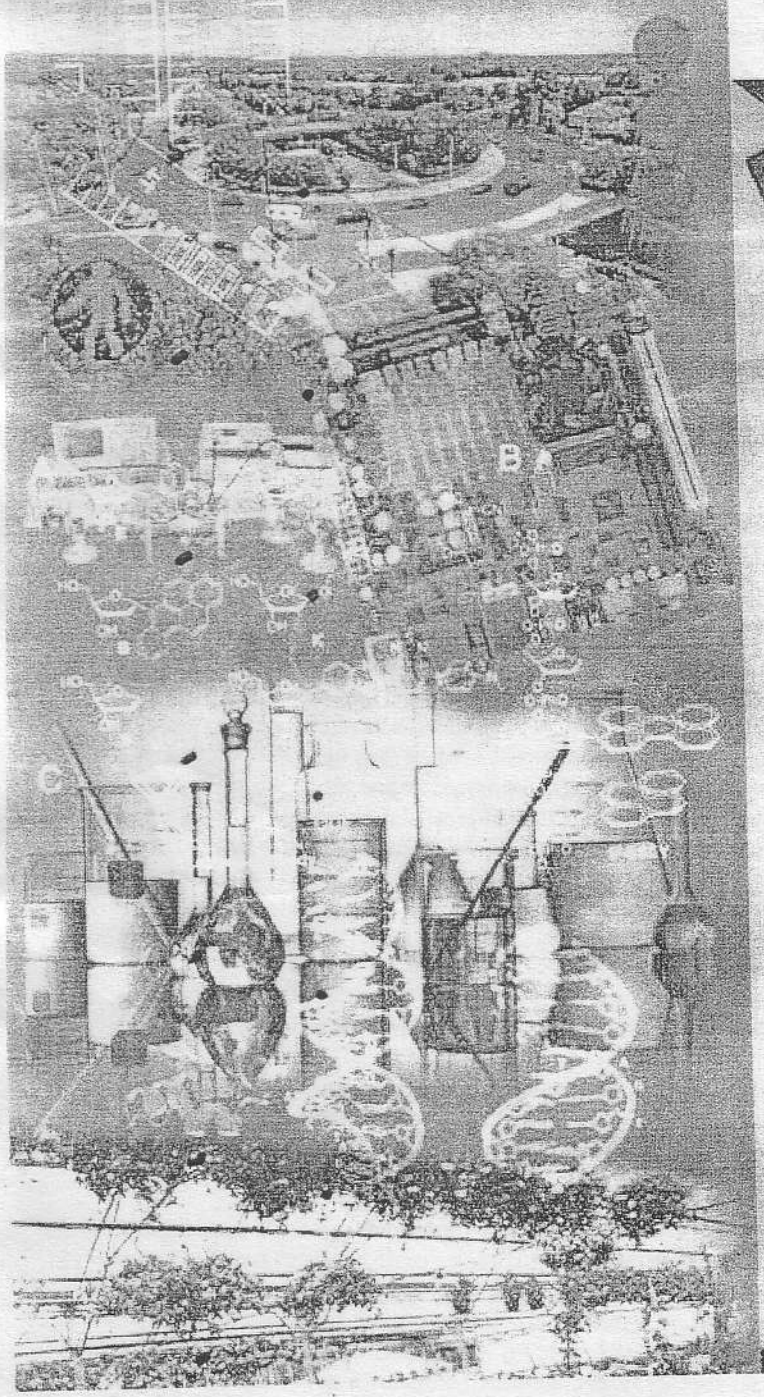
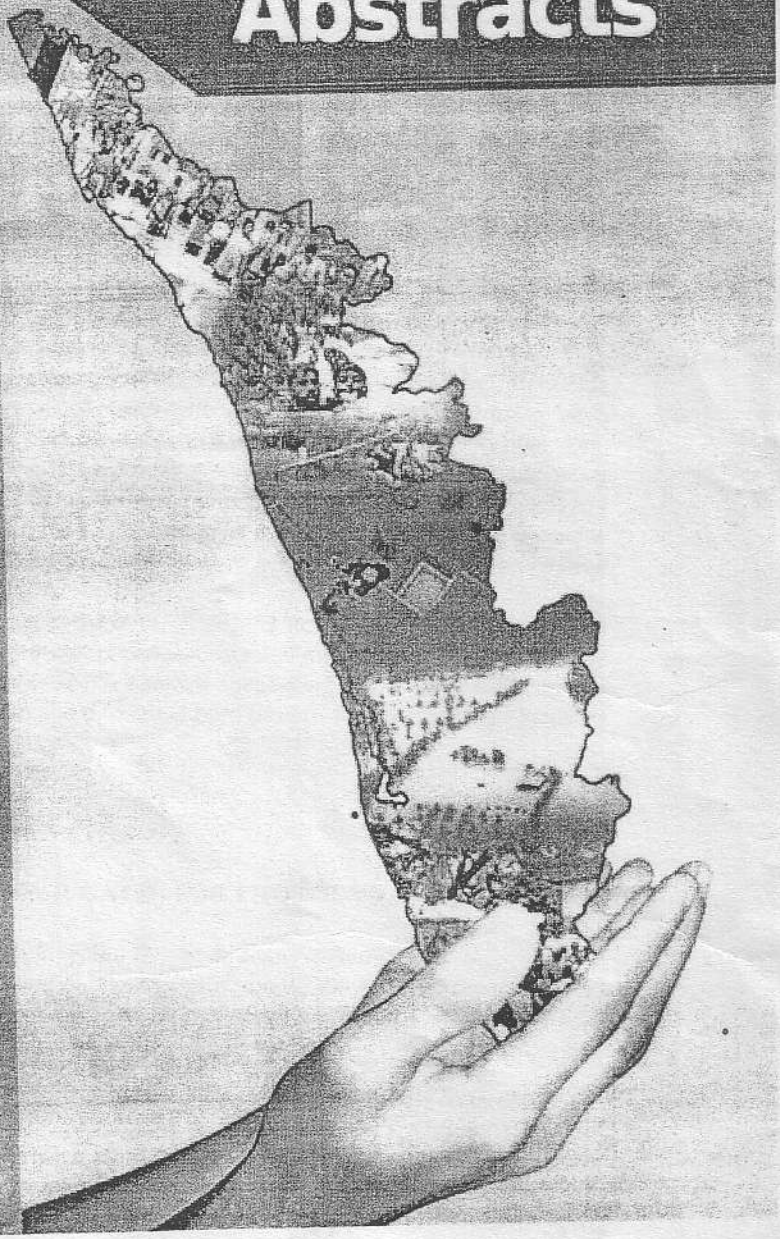
Abstracts





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Conclusion: High luminescence property together with the high thermal stability would enable the use of synthesizedTb^{3+} based hybrid material in applications like luminescent probes, sensors, etc.
Key words: inorganic-organic hybrid material, zeolite Y, luminescence

03-05

NIR-II MOLECULAR PROBE AS CONTRAST AGENT FOR PHOTO ACOUSTIC IMAGING

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Background: Photoacoustic (PA) imaging is an emerging modality that brings significant promise to enhance the depth of penetration as well as spatial resolution, while maintaining the high contrast of optical imaging. However, the utility PA imaging has not been fully established owing to a lack of analyte-specific photoacoustic probes. In this work, we will present the development and evaluation of novel PA contrast agent based on squaraine (SQ) dye, which has an intense absorption at NIR-II region, poses much better photostability and higher PA efficiency compared to commercial ICG (Indocyanine green)dye.
Methods: SQ dyes were synthesized by the condensation reaction of benzindolium salts (1) and squaraine derivatives in 1:1 butanol/benzene mixture at 100^{0}C gave the corresponding SQ dyes in 10% yields. The structure was characterized *via* ^{1}H &^{13}C NMR, and mass spectrometry. The spectral features of dyes were measured using UV-Vis-NIR spectrophotometer (Evolution 220). To evaluate the PA efficiency, solutions of SQ1, SQ2 and ICG in dimethylsulphoxide (DMSO) at optical density (OD) of 1.0 were prepared and their photoacoustic spectrum was measured using Vevo 2100/LAZR system operating with a 40 MHz linear array transducer (FUJIFILM VisualSonics, Inc., Toronto, ON, Canada). **Results and Discussion:** SQ dyes absorbs in the NIR-II window, more specifically, has a strong absorption within 850 to 1000 nm. Furthermore, SQ dyes has high molar extinction coefficients in the range (2-4x10^5 M^{-1} cm^{-1}) and exhibit higher photostability. The PA signal strengths recorded for the SQ1 dyes are 4.8 -fold stronger than the signal for the benchmark compound ICG. The signal strength recorded for SQ2 is still nearly 3.6-fold stronger shows the relative advantages of the SQ dyes overICG.
Conclusions: We have demonstrate the synthesis of small organic SQ dyes, absorbing in the NIR-II region by appropriate turning the donor and acceptor moiety. SQ dyes exhibits better photo-stability and higher photoacoustic activity compared to the commercially available ICG, makes it a promising PA contrast agent. Ongoing studies will examine scattering and penetration effect on both tissue mimic phantom and biological hard tissues. Future work will focus on the application of SQ dye as contrast agent for *in vivo* PA imaging.
Keywords: Near Infrared, Contrast agent, Photoacoustic Imaging,

03-06

GRAPHENE QUANTUM DOT- PORPHYRIN NANOCONJUGATES FOR PHOTODYNAMIC THERAPY

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Background: Cancer is one among the leading cause of death globally and around one third of deaths from cancer are due to the behavioral and dietary risks. In one year, Kerala has roughly 35,000 new cancer cases. Traditional therapeutic approaches such as surgery, chemotherapy, and radiation have significant drawbacks, increasing patient's physical and mental trauma and relatively low success rates. Thus, more effective and targeting cancer therapies are required. Photodynamic therapy (PDT) which involves the combination of light, photosensitizer(PS) and molecular oxygen, has been recognized as a valuable treatment option for localized cancers. Herein we demonstrate porphyrin derivative conjugated with graphene quantum dots (GQDs) for PDT applications. Porphyrins are efficient candidates widely being used for PDT applications owing to their efficient singlet oxygen production and high absorption coefficient in the long