INDO SWISS JOINT RESEARCH PROGRAMME (ISJRP)

JOINT RESEARCH PROJECT

ABSTRACT

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ORGANIC FLOURINE, A COPIOUS RESERVE FOR FUTURISTIC MATERIALS

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PROJECT ABSTRACT

The emphasis on the synthesis and fabrication of organic materials for applications in electronic devices in recent literature arise form the fact that organics provide excellent source for manipulation of electronic properties at the molecular level. Together with supramolecular design through crystal engineering principles, it is possible to make organic materials with the robustness and temperature resistance on par with inorganic materials which are currently in use. It has become clear that weak intermolecular interactions such as π…π contacts in aromatic compounds, halogen bonding and C-H…O interactions provide a much wider choice to design cooperative directional contacts in molecular crystals generating an overall compact and sturdy design of the final product. Organic compounds containing fluorine are abundant particularly among pharmaceuticals (over 15% of the commercially viable drugs) and offer a variety of weak yet directional interactions like for example C-H…F, C-F…π and C-F…F-C contacts. The utilization of the fluorine atom in such interactions effectively monitors control on lowering energy gaps in semiconductors and the current proposal targets this feature to design new semiconductors for optoelectronic devices and other futuristic functional materials. Fluorinated organic compounds thus provide an unlimited choice to design and fabricate new devices and effectively address the modern day requirements. Ambipolar field effect transistors for invertors, toxic storage materials in channel structures and magnetic materials for future applications including medicine are some of the sought after devices based on fluorinated organic compounds. The proposal addresses all these features at the fundamental level starting from the evaluation of the charge density distribution in molecular crystals to synthesize and characterize materials for application in futuristic functional devices described above.