



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.
Thesis Title: **Molecular Modifications of Flexible Porous Substrates Through Depositions**

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SHORT ABSTRACT

The thesis reports important applications of surface chemistry and nanoscience that can be considered exceptional and has the potential for commercialization both in the electronics and biomedical industry. In general, the thesis illustrates a molecular modification of flexible porous substrates through the surface deposition. The thesis reflects the various types of deposition mechanisms that can lead to surface modification. Apart from that, evaporation-induced pattern formation by colloidal particles from a suspension was also extensively studied.

In the first chapter of the thesis, the interactions among the solute, solvent, and substrate and the resultant deposition patterns were discussed. The guidance to the researchers aiming to obtain evaporative-induced patterns is also provided by constructing a deposition zone mapping based on the system criteria.

In the second work, locally available hydrophilic Eri silk fabric was modified into hydrophobic Eri silk fabric by depositing a nanometer-thick coating of OTS (octadecyltrichlorosilane). The modified silk fabric can be used as a mask without compromising breathability and that can be a better alternative to the N95 and surgical mask. This will facilitate the availability of protective masks to the common masses.

In the next chapter, the same surface modification methodology was exploited for the synthesis of hydrophobic bandages which would keep the wound dry and the healing process would be much faster.

The contents of the thesis are highly relevant to the current topics of global scientific research which includes work on surface modification and fabrication of efficient flexible hydrophobic material and the thesis has excellent findings to add to them.