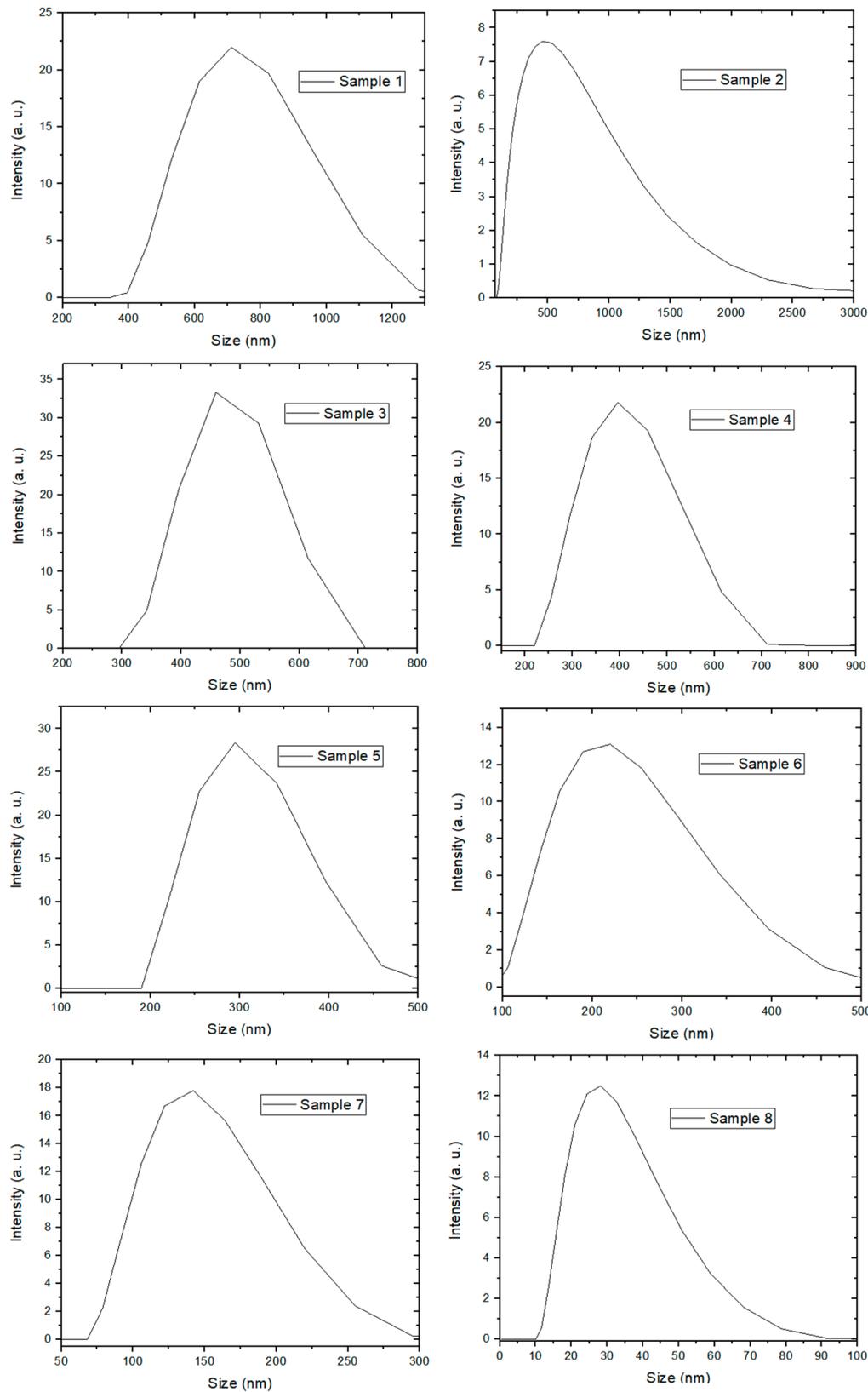


# Supplementary Material

The DLS results of the samples presented in Table I are presented below Figure S1.



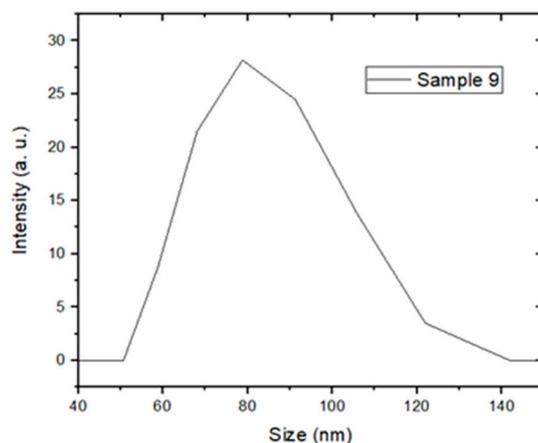


Figure S1. (a-i) Particle size distribution by DLS of the samples.

In Figure S2 (black) we can observe a well-defined trimodal distribution, belonging to MCM-41, at 1.26nm, 1.75nm and 2.6nm, with the 1.26nm peak having a higher pore volume concentration. On the other hand, Figure S2 (red) presents a Penta modal graph (5 peaks), at 1.15nm, 1.47nm, 1.7nm, 1.9nm and 2.7nm belonging to the MCM-41@IONP, preserving the highest volume concentration of pore in the first peak.

This analysis was carried out using the BJH method for mesoporous materials [51].

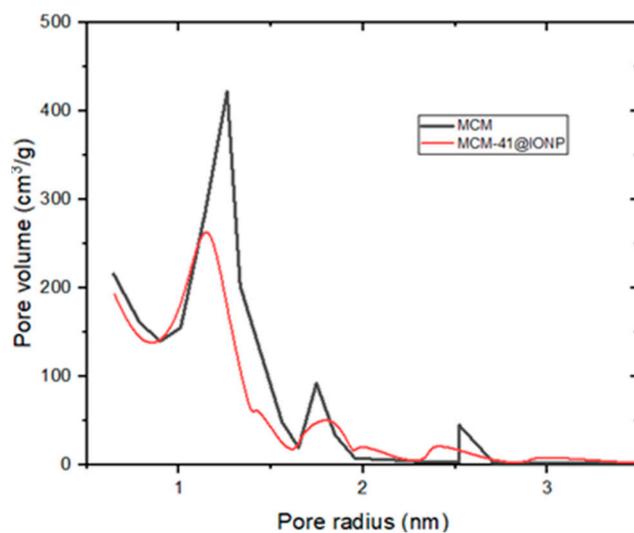


Figure S2. Comparison of pore size distributions of MCM-41 and MCM-41@IONP.

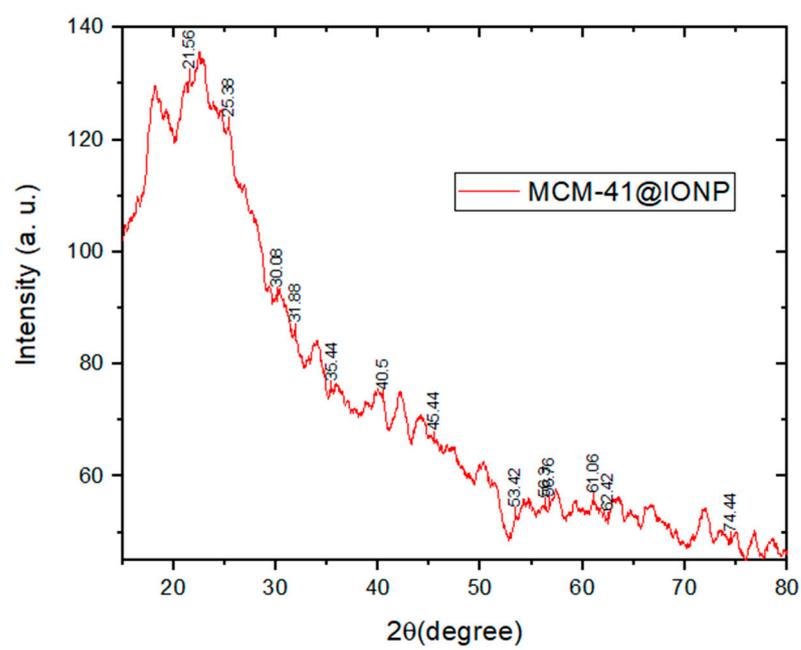


Figure S3. The high angle X-ray diffraction pattern of the MCM-41@IONP.

A general scheme of the preparation route of the Metal-Insulator-Semiconductor electronic device is presented.

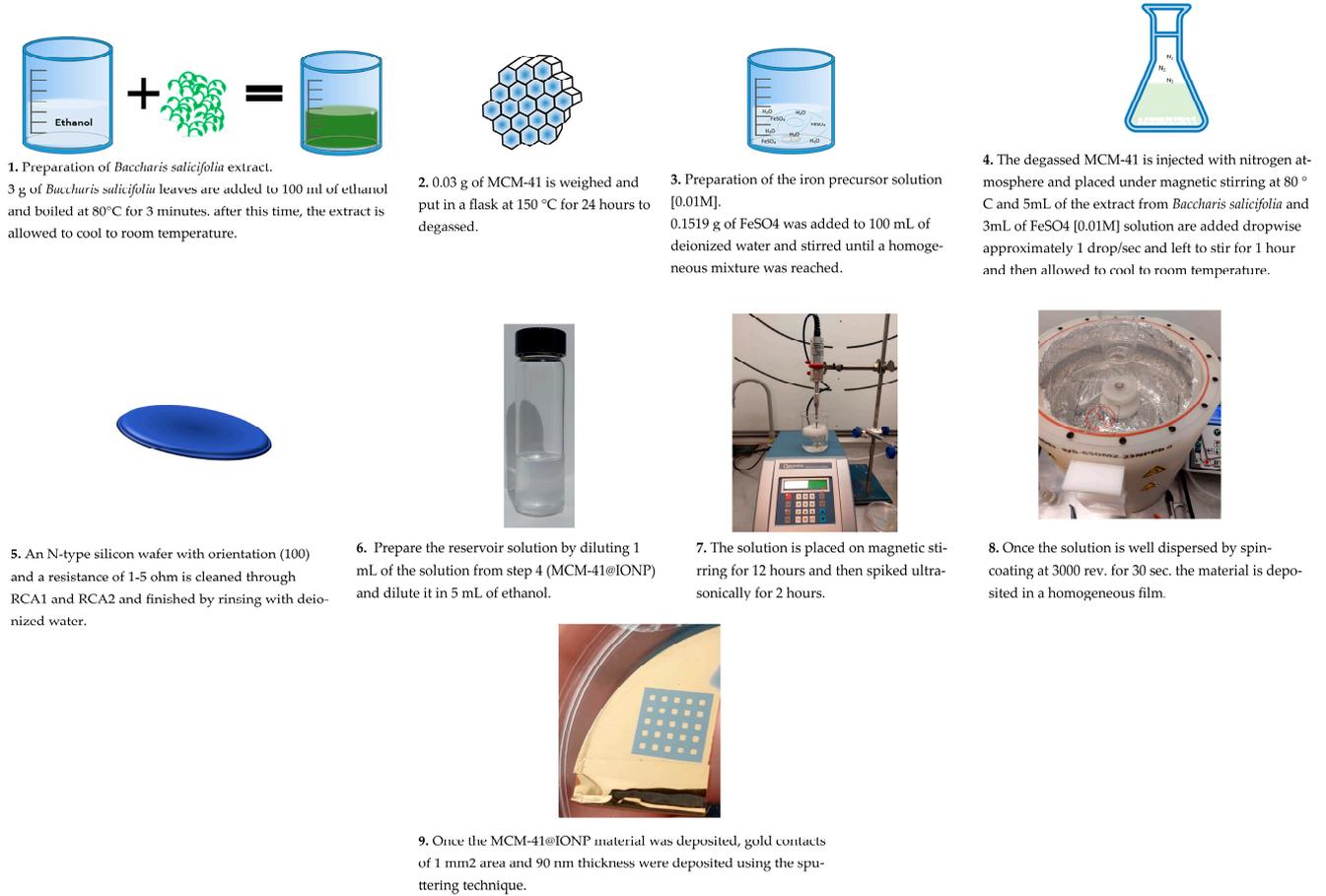


Figure S4. General scheme of the synthesis methodology, incorporation of iron oxide nanoparticles and construction of the MIS-type device.