Supplementary information

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Development of PANI/MWCNTs decorated with cobalt oxide Nanoparticles towards Multiple Application sites of Electrochemical, Photocatalytic and Biotechnology

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Adsorption studies

From the experimental observation it was observed that for the dye RhB, composite material showed higher photochemical degradation so it was selected for adsorption study. The effect of parameters as such as pH, initial dye concentration and temperature on the removal of dye was studied.

It is depicted from the Figure S-1 that pH change also influences dye photodegradation. With the increase in pH range from 2-8 the adsorption of dye was increased from 30 to 95%.There is no effect on dye uptake with further increase in pH.

Different concentrations of dye solution (25–300 mg L^{-1}) were treated with known amount of the photocatalyst (Fig S-2.).It was observed that with the increase in concentration the uptake of dye was decreased from 95% to 75.5% which is due the lesser number of adsorption site

available at high concentration [53, 54]. In other words it is explained as that at initial concentrations more dye molecules are available for excitation and energy transfer. A stage is reached (high concentration of dye) when several monolayers of adsorbed dye on the catalyst surface which leads to the decrease in adsorption.

At different temperatures (23, 35, 40, and 45°C) it was observed that with the increase in temperature the adsorption of dye was increased from 55.5% to 95 % up to 45°C and after that no further change was observed in the adsorption of dye up to 55°C (Fig S-3).

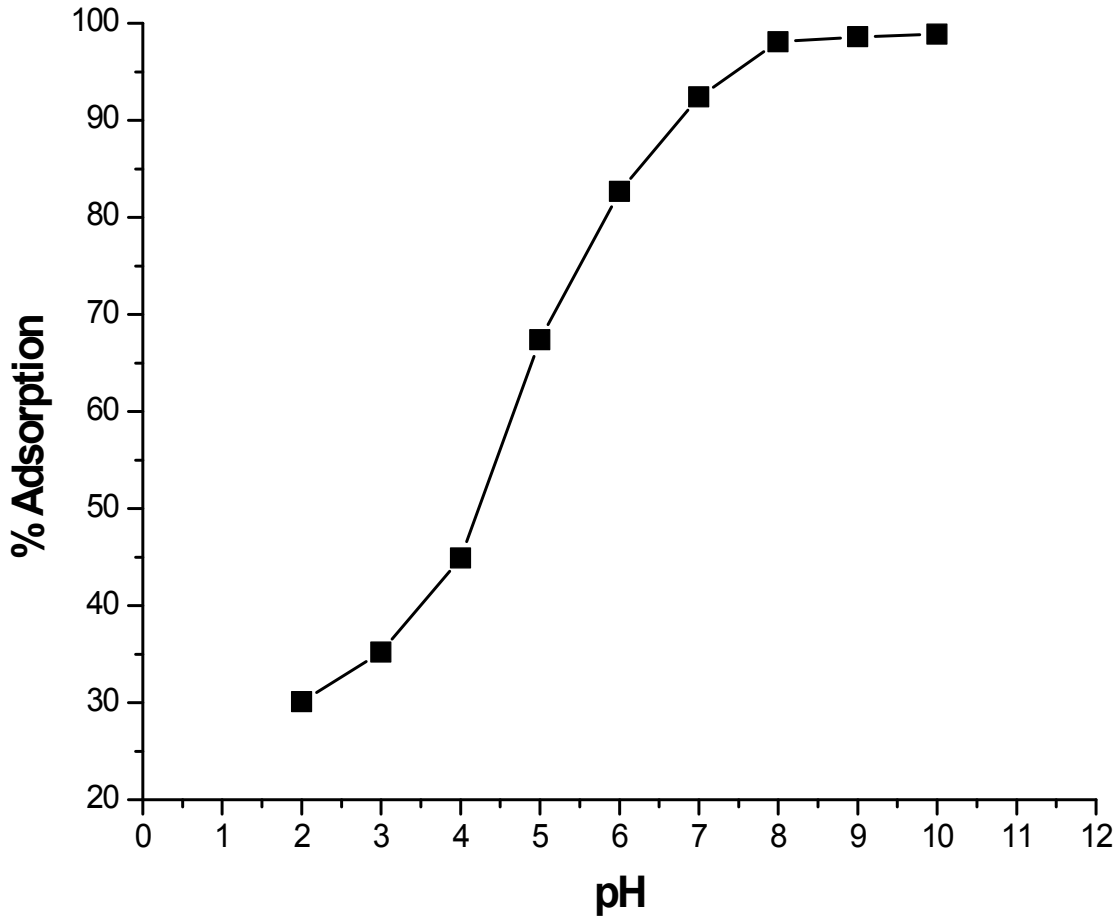

Figure ES-1. Adsorption of dye at different pH

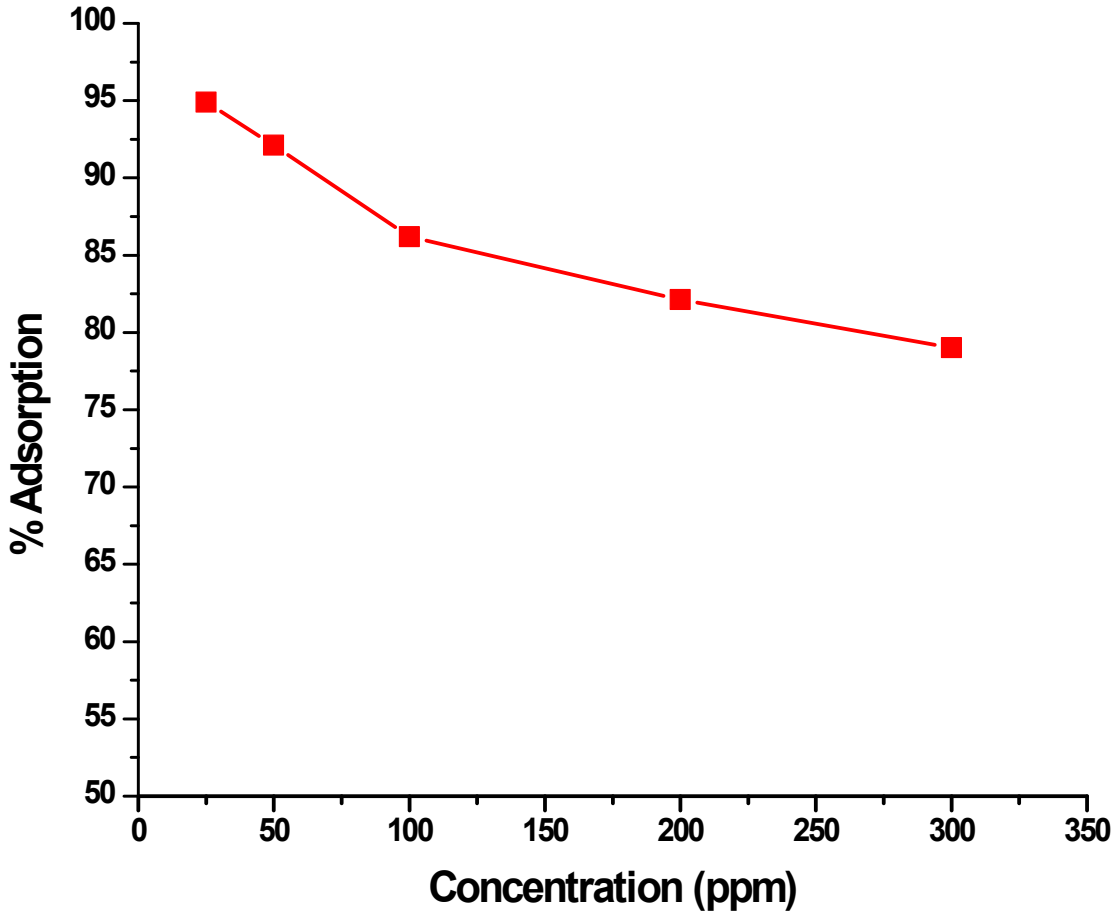

Figure ES-2. Adsorption at different initial dye concentration

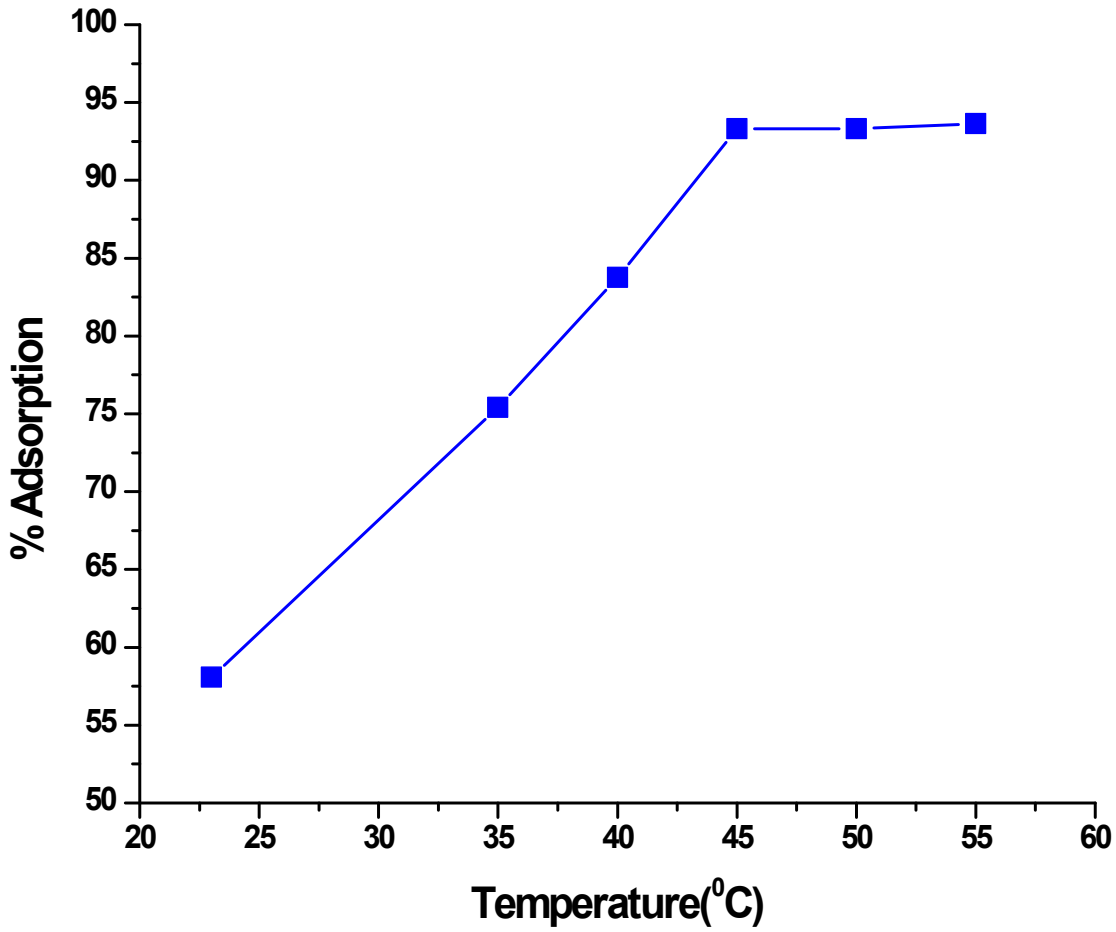

Figure ES-3. Adsorption of dye at different temperatures