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FUNDAMENTAL STUDIES OF CO_2 ASSOCIATION WITH NI(II)TETRAPHENYLPORPYRIN COMPLEX

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Environmental pollution caused by CO_2 emission has been a major concern in the 21st century. This problem has been a big challenge for Green chemists so that they have attempted to find out solutions to reduce CO_2 level and mitigate pollution present in the atmosphere nowadays. Work related to this area mainly focuses on the synthesis of efficient catalysts to bind and reduce environmental pollutants. In this regard, we attempted to study the CO_2 binding capacity of *Ni(II)tetraphenylporpyrin* complex since it is structurally similar to natural molecules that interact with CO_2. *Tetraphenylporpyrin* was directly synthesised using pyrrole and benzaldehyde. Purification was done by recrystallisation with dichloromethane. *Ni(II)tetraphenylporpyrin* was synthesised using *tetraphenylporpyrin* ligand by refluxing it with dry $NiCl_2$ in dimethylformamide. The synthesised *Ni(II)tetraphenylporpyrin* was characterised by using H^1-NMR, UV-Visible, XRF, XRD and FT-IR spectroscopic techniques. CO_2 trapping capacity was studied with Vernier CO_2 gas sensor which is capable of measuring the transmitted amount of CO_2 from a sample. The new band appeared at 694.40 cm^{-1} in the FT-IR spectrum after passing CO_2, indicates the formation of Ni(II)-CO_2 bond. UV-Visible and CO_2 sensor studies reveal that *Ni(II)tetraphenylporpyrin* has higher CO_2 association capacity (99.3%) than $NiCl_2$ and solvents (toluene : hexane (4:1) and water) used.