A

MINOR PROJECT

ON

IRON NANOPARTICLE SYNTHESIS

SUBMITTED IN

DEGREE OF BACHELOR OF

TECHNOLOGY IN CHEMICAL ENGINEERING

SUBMITTED BY

ANKUR KUMAR

AAYUSH KUMAR

PANKAJ KUMAR

SUJIT KUMAR

UJJAWAL MARAVI

TEJAVATH VEERANNA

GUIDED BY

DR. SANDEEP DHARMADHIKARI

ASSISTANT PROFESSOR DEPARTMENT OF CHEMICAL ENGINEERING

Assistant Professor

Department of Chemical Engineering

School of Studies of Engineering and Technology

Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)- 495009

Abstract :-

Iron nanoparticles have shown great applications and potentials associated with their unique properties in different fields such as catalysis, medicine, and environmental remediation. This project is carried out to synthesize iron nanoparticles with the commonly employed co-precipitation method. It is a simple and low-cost technique. Co-precipitation is about the precipitation of iron salts simultaneously with a base to form nanoparticles in a controlled manner.

Precursor concentration, pH, and temperature of the reaction are some of the parameters investigated to get the optimum synthesis process. In light of these parameters and to carry out the process within their controlled range, the aim was to prepare iron nanoparticles with the desired properties such as homogeneous size, shape, and magnetic properties. Dissolution of iron salts in an aqueous medium, with a gradual addition of a precipitating agent under controlled conditions, was involved in the synthesis process. Several analytical techniques were used in the characterization of the synthesized nanoparticles. The morphological particle size and detailed information on the morphology of the particles were derived from transmission electron microscopy (TEM), while X-ray diffraction (XRD) yielded information on the crystalline structure of the nanoparticles. The magnetic properties of the nanoparticles were determined by vibrating sample magnetometry (VSM), throwing light on their fitness for use in applications where specific magnetic behaviours are demanded.

CERTIFICATE OF APPROVAL

This is to certify that the project entitiled " **Iron Nano particle Synthesis** " a review report submitted by **Ankur kumar**(22021111),**Aayush kumar**(22021102),**Sujit kumar**(22021158),**Pankaj kumar** (22021133),**Ujjawal Maravi**(22021159),**Tejavath Veeranna** (22021161) in fullfillment of requirement for the degree of **Bachalor of technology in Chemical engineering** is a record of bonafide and original research work carried out by them under our guidance and this project does not include any work which has previously been submitted for the award of other degree ,diploma, associate-ship , fellowship,or other similar title of them.We,further clarify that the work report in this project was carried out independently by the candidates .

Approved by

Dr. Raghwendra Singh Thakur

Head

Department of Chemical Engineering

School of Studies Engineering and

Technology Guru Ghasidas

University Bilaspur , Chhattisgarh

Guided by

08/08/24

Dr. Sandeep Dharmadhikari

Assistant Professor

Department of Chemical Engineering

School of Studies Engineering and

Technology Guru Ghasidas

University Bilaspur , Chhattisgarh