

## **Synthesis and Characterization of Iron Pyrite Nano Particles for Pollution Control**

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Pyrite, FeS<sub>2</sub> commonly referred as fool's gold is the most abundant sulfide phase in the earth surface region. The reactivity of pyrite is of central importance in a devastating environmental issue known as acid mine drainage, and in beneficial commercial processes such as mineral benefaction. Pyrite is an unwanted entity in nation's graphite which degrades the value of the mineral repository. The overall aims of this project were two-fold: in one way purification of the graphite by removing pyrite will be suggested probing its surface properties. Once it is separated, the value of this unwanted pyrite will be added by enhancing water splitting to generate OH<sup>-</sup> radical for non selective destruction of organic pollutants in water. In this work, in order to examine the surface properties pyrite samples were synthesized at laboratory scale using FeSO<sub>4</sub>·7H<sub>2</sub>O, NaHS and elemental S as starting materials. The corresponding interactions of Fe (II) with freshly polysulphide were examined at 25°C over the pH range 5.5 to 8. Attempts were made to achieve pure pyrite phase through a simple chemical reaction in the liquid state followed by annealing. The phase purity and the structure were determined using FTIR spectrometry. Surface titrations were done for three different ionic strengths to determine zero point charge value of pH. The XRD and TEM analyses are currently in progress.

Key Words: Iron Pyrite, FTIR Spectroscopy, Surface Titrations