

# Characterization of Fe Doped AC/TiO<sub>2</sub>

B.Saritha, M.P. Chockalingam

**Abstract:** Abstract: The photocatalytic composite Fe doped AC/TiO<sub>2</sub> has been prepared by sol-gel method. The prepared Fe doped AC/TiO<sub>2</sub> composite were characterized by scanning electron microscope (SEM) and X-ray diffraction (XRD). The SEM analysis showed that Fe and TiO<sub>2</sub> were attached to the Activated Carbon surfaces. The X-Ray Diffraction data showed that Fe doped AC/TiO<sub>2</sub> composite mostly contained anatase phase.

**Keywords** Fe doped AC/TiO<sub>2</sub> composite, Photocatalytic degradation, UV irradiation.

## I. INTRODUCTION

To keep up the photocatalytic movement, the nanoparticles titania (TiO<sub>2</sub>) ought to be kept onto supporters with high surface territory, for example, a permeable structure. It is outstanding that enacted carbon (AC) is one of the ease and generally accessible permeable materials with moderately huge surface territory. Business Activated Carbons have been broadly utilized as adsorbents and synergist supporters in fluid media to expel contaminations and to recuperate significant items. Nonetheless, in the down to earth applications, the division of Activated Carbons from the fluid medium usually includes complex methods, for example, filtration or centrifugation. It has been indicated that attractive particles could be effectively isolated from suspension framework (Beydoun et al. 2002, Chen et al. 2001, Fuertes et al. 2006). Thus a composite photocatalyst joining enormous surface zone and attractive detachability is alluring. This exploration work has been centered around the union of Fe doped AC/TiO<sub>2</sub> composite by Sol-gel strategy and portrayal of orchestrated composite by SEM, XRD, EDAX and VSM

## II. EXPERIMENTAL

### a) Photocatalytic composite :

The photocatalytic composite was synthesised using different chemicals like Ferrous Nitrate [Fe(NO<sub>3</sub>)<sub>3</sub>·9H<sub>2</sub>O], Ethanol, Ethylene Glycol, Titanium Isopropoxide, 2-propanol and Commercial Activated Carbon(CAC). All the chemicals used in this study were of the highest purity and are of analytical grade.[1]-[3]

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## III. RESULTS AND DISCUSSION

### Surface morphological studies

SEM pictures give helpful data with respect to the surface morphology of the orchestrated photocatalytic composite Fe doped AC/TiO<sub>2</sub>. The SEM pictures of Fe doped AC/TiO<sub>2</sub> composite which has been appeared in Fig.3. delineates that the particles are agglomerated. At higher calcination temperatures, the bigger molecule size with circular morphology is gotten. Grain limits are obviously seen in the SEM micrographs of the examples. Additionally, it unmistakably uncovers the surface and porosity nature.[4]-[8]

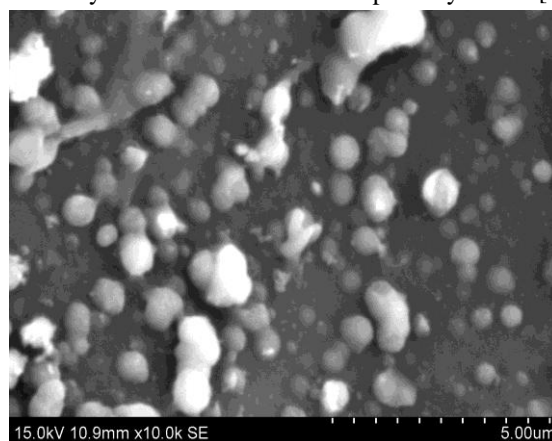


Fig (a)

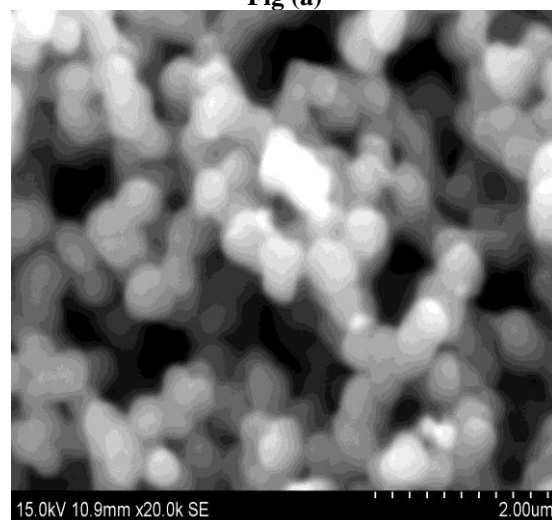


Fig 3.SEM images of (a) Fe doped AC/TiO<sub>2</sub> composite (5 μm), (b) Fe-AC/TiO<sub>2</sub> composite (5 μm)

### XRD measurement

The XRD result for Fe doped AC/TiO<sub>2</sub> composite have peaks at 2θ values of 25.36°, 37.64°, 48.1°, 55.2°, 62.68°. which indicates the formation of anatase phase of TiO<sub>2</sub>.

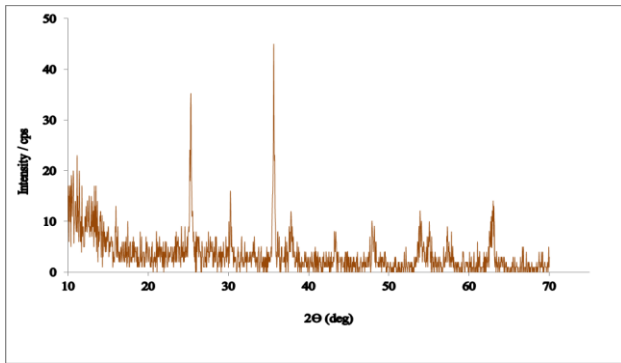


Fig. 2 XRD pattern of Fe-AC/TiO<sub>2</sub> composite

#### IV. CONCLUSION

The synthesised photocatalytic Fe doped AC/TiO<sub>2</sub> composite has been successfully synthesized and characterized using X-ray Powder Diffraction(XRD) and Scanning Electron Microscope(SEM).

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