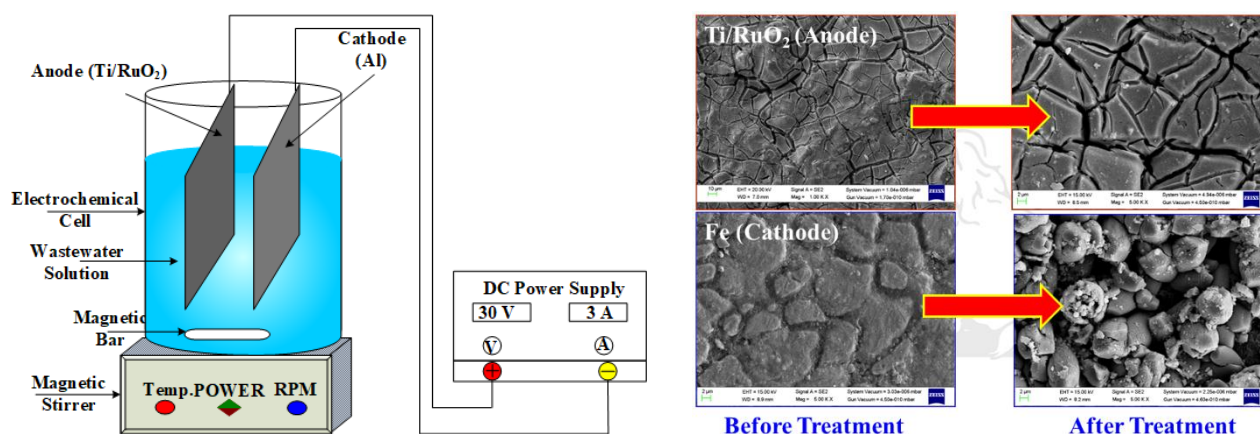


Denitrification of actual wastewater by nano coated dimensionally stable anodes (Ti/RuO<sub>2</sub>)Rohit Chauhan <sup>1</sup> and Vimal Chandra Srivastava <sup>2</sup><sup>1&2</sup> Department of Chemical Engineering, Indian Institute of Technology Roorkee,  
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**Abstract:** Comprehensive utilization of nitrogen based fertilizers as well as inappropriate treatment of industrial wastewater is responsible for nitrate contamination in water bodies. There are many systems like drinking water supplies, nuclear & explosive waste, analytical procedures, origin of ammonia on early earth and generation of some valuable, relatively expensive compounds, in which nitrate and nitrites are contaminated as pollutant [1, 2]. Recently electrochemical reduction of nitrate by nano coated surface electrode, is widely used due to its enhanced efficiency, environmental friendly and low cost. It does not produce secondary pollution. In this study, nano coated Ti/RuO<sub>2</sub> used as anode whereas aluminum (Al) is used as a cathode for electro-reduction of nitrate contaminated wastewater. Nitrate, nitrite and ammonia was identified by using ion chromatography (IC-881, Metrohm) and standard colorimetric method respectively. Several authors reported that nitrate reduced into nitrite, ammonia and nitrogen gas by several reduction path which is dependent on *in situ* generated intermediates by nano coated surface electrodes. Electrical energy and electrode cost can be utilized for estimation of operation cost for denitrification of wastewater. It was reported that reduction of nitrate follows first order kinetic model at low concentration of nitrate whereas it follows zero order kinetic model at high concentration of nitrate [3]. It was found that nitrate is reduced ≈45% and ≈51% at current density (J) of 142.86 and 285.71 A/m<sup>2</sup> respectively



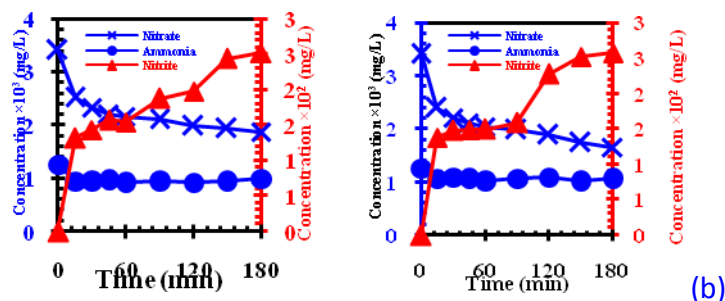


Figure1: (a) Schematic diagram of electrochemical set-up and SEM photographs of the samples before and after treatment (b) Concentration profile of nitrate, ammonia and nitrite in aqueous solution at current density (J) of (C) 142.86 A/m<sup>2</sup>; (D) 285.71 A/m<sup>2</sup>.

**Keywords:** Electro-reduction, Pathway, Kinetics.

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