Ammonia stripping vs ion exchange

Ammonia recovery process (Ammonia stripping Waste water treatment involves reduction in the concentrations of organic and inorganic pollutants andto recover useful products (Argonne National Laboratory 75). Removal of nitrogen from wastewater has become quite significant during the past few years due to increased importance of waste water reuse and safe discharge in environment (Lekang 121). The most widely physical process being used in waste water treatment is ammonia stripping. Ammonia stripping is efficient in waste water that has NH3 contents ranging from 10-100 mg/L. This process is based on principle that NH3 is present in water (neutral pH) as ion. It is recovered as a gas by raising pH of water with alkaline addition such as caustic or lime (EPA 1). The procedure is enhanced by increasing the operating temperature of tower (Henze and van Loosdrecht 140). Two types of towers are used in ammonia stripping i. e. cross flow and counter current. A cross flow tower permits the solvent gas (air) into total depth of fill and flows through the packing as the alkaline waste water flows downward. On the other hand, in a counter current tower, air enters through openings at the bottom as waste water is propelled to the top of packed tower. Free NH3 is converted into air stream from falling water and discharged into atmosphere (EPA 1) Advantages and disadvantages of ammonia stripping: It is a simple mechanical process which is not affected by waste water fluctuations and is not disrupted by presence of toxic substances given the air temperature and pH remains stable. It creates no back wash or regenerations. On the other hand, ammonia stripping has several disadvantages which include higher maintenance costs and power requirement for pumping. It does not remove nitrite or organic nitrogen. Air pollution problems may occur due to NH3 reaction and high pH may corrode

the wood of stripping tower (EPA 2). Ion exchange process: Ion exchange is one of the common methods used in industrial waste water treatment. This process is practical in removing heavy metals, salts and NH3. It is a procedure to remove undesirable ions in the form of contaminants as a final or tertiary step. Ion exchange is based on the fact that different ions have different electrical charges. Due to this charge, ion from the solution is exchanged for a similarly charged ion attached to an immobile solid particle. These ion exchange particles may be zeolites or synthetic organic resins. Resins can be classified as positively charged cation exchangers or negatively charged anion exchangers (EPA 4). Ion exchange can be operated either in batch mode or continuous flow mode. In batch mode, a container of fluid is mixed with appropriate amount of resins. After a state of equilibrium is achieved, treated fluids and resins are separated by sedimentation, filtration or solid separation process. Ion exchange resins are later washed and recharged with appropriate acid/base or salt (Woodard & Curran 322). Continuous flow mode is a far more widely used procedure in which a continuous exchange of ions occurs by passing the fluid through one or more cylindrical containers packed with resin beads and is known as columns. Advantages and disadvantages of ion exchange process: This process has the ability separate components from dilute wastes. Also, treatment of hazardous waste i. e. radioactive materials and recovery of precious metals and recycling components is possible. Limitations of this process includes specific concentration of waste material in effluent can be treated. This process is vulnerable to fouling produced by organic waste material present in water. In addition sometimes it lacks selectivity against specific target ions. Works Cited Argonne national laborotory. Environmental consequences

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