

A Re-examination Of The Potential For Chemically Bulking Wool In Liquid Ammonia

Metals Precipitation from Effluents: Review

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Abstract: At the onset of 21st century, the pollution of surface and groundwater by toxic metals continues to represent a challenge for the authorities responsible for environmental protection. The uncontrolled rejection of metals in aquatic ecosystems such as Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Tl and Zn, constitute a serious threat to human and animal health. Several methods of treatment of waters polluted by metals have been proposed during the last several decades. However, the technique of precipitation of metals remains the most favorable option on an industrial scale due to reasons of cost-effectiveness, performance, and simplicity. The present review presents current knowledge on various technical alternatives for precipitation of metals. The discussion relates to the individual characteristics of the metal contaminants, as well as their behavior compared to various techniques of precipitation.

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Introduction

Environmental contamination with heavy metals is a consequence of technological and industrial advances (Davydova 2005; Nriagu 1996; Nriagu and Paayna 1988; Wong et al. 2006). The principal problem associated with this anthropogenic contamination is its toxicity against all living organisms, in particular, humans (Baath 1989; Chapman et al. 2003; Florea and Büsselberg 2006; Galvin 1996; Sharma and Agrawal 2005). The risks associated with the presence of potentially toxic metals in soils and waters are rather well known and well documented (Allen 2002; Kabata-Pendias 2001; Lippmann 2000). It is, therefore, essential to remove or reduce the presence of these inorganic contaminants in order to diminish the possibility of uptake by plants, animals, and humans and eventual accumulation in the food chain and also to prevent them from contaminating surface and groundwater by dissolution or dispersion (Kabata-Pendias 2001; McLaughlin et al. 2000).

For these reasons, much research has been carried out in the last decades to develop efficient and cheap methods for the treatment of metal-polluted effluents (Blais et al. 1999; Kurniawan et al. 2006). Table 1 illustrates the principal technologies used and proposed for the removal of potentially toxic metals from efflu-

ents. Among these technologies, precipitation is the most widely used approach for the removal of metals from groundwater, surface water, and industrial effluents (FRTR 2005; Levasseur et al. 2005; Mirbagheri and Hosseini 2004). This review discusses different precipitation techniques used for the removal and recovery of toxic metals from effluents.

Chemical Precipitation

Metals can be removed by precipitation as metal oxides/hydroxides, sulfides, carbonates, and phosphates. Selective metal precipitants have also been developed in the last few years for the removal of toxic metals from effluents (Tandras 2000). Oxidation/reduction reactions can also be used for the precipitation of specific metal contaminants, like As and Cr. Most cheaper and efficient technological options often involve biological activities for the precipitation of metals from industrial effluents. Coagulation-flocculation and other techniques can also be used in combination with precipitation methods to treat metal-contaminated solutions. These methods are discussed in the following sections.

Metal Hydroxides

From a chemical point of view, precipitation is a complex phenomenon resulting from the formation of conditions of supersaturation. It can be described by three steps: (1) nucleation or germination; (2) crystalline growth; and (3) flocculation (Patterson 1988).

Nucleation was studied by various authors, in particular, with regard to the removal of zinc and iron originating from the acid mining drainage (Zinck and Aubé 1998). Nucleation or germination corresponds to the appearance of the first germ by condensation of metal salts, followed by the growth of this germ until the stage of supersaturation of the solution and the formation of the solid (Duan and Gregory 2003).

Soluble metals can be recovered in insoluble forms as hydroxides according to Eq. (1) by using several alkaline reagents, like

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, English, Article, Report edition: A re-examination of the potential for chemically bulking wool in liquid ammonia / by C.K. Rowan and P.E. Ingham. Rowan.A re-examination of the potential for chemically bulking wool in liquid ammonia / by C.K. Rowan and Wool Research Organisation of New Zealand reports ; no.Results 1 - 11 of 11 Re-Examination of the Potential for Chemically Bulking Wool in Liquid Ammonia: WRONZ Report No R by C. K. Rowan and P. E. Ingham.Maintaining the pH and /or osmolarity of the liquid formulations, Function of fillers: Bulking agent: Fillers add volume and/or mass to a drug substance, thereby facilitating precise metering They must be physically and chemically stable. 5. . Use for preservation of natural fiber like cotton and wool.Wang, Y.-T. () Effect of chemical oxidation on anaerobic biod?g radation of model . types and to evaluate relationships between sludge bulking and factors such .. heterotrophic bacteria, and sludge thickening and biological re actions in trations of ammonia was assessed in a sequencing batch reactor operated in.Wanner, J. () The Implementation of Bulking Control in the Design of Activated . High liquid recirculation rates and pH control mg/L chemical oxygen demand (COD) with a retention . potential for improving the reliability of fixed-film biotreatment transfer rates, biological reaction rates, and electrochemical re.Part III Other Potential Applications of the New Technology However, liquid- state fermentation has been developed on an industrial scale chemicals as low volume products and as bulk chemical products usually fall within the recovery require careful examination not only during the initial cloning and expression.This type of drying prevents the formation a liquid?vapor meniscus which recedes . 35 mW m-1 K-1 for polyurethane foam, mineral wool and expanded polystyrene .. and especially with aerogels or aerogel-like materials of low bulk densities. Hair, L. M.; Pekala, R. W.; Stone, R. E.; Chen, C.; Buckley, S. R , J. Vac.The banana fibres were subjected to various chemical modifications such as .. Keywords: Sound reduction ; bulk density ; paper pulp ; banana fiber ; biocomposite . banana plant available in the form of its pseudo stem and the potential R Liquid ammonia dyeing of cationic ramie yarn with triazinyl reactive dyes.Examination of Current BUD Practices and Tools through Case Studies. .. The potential for risk depends both on chemical concentration and form .. In a different fashion from the bulk fill and manufactured soil, waste .. such as pH, liquid to solid ratio, and leaching kinetics, and EPA is Mineral wool.Incorporation of biochar into soil is of global interest as a potential Keywords: nitrogen, nitrous oxide, ammonia, ruminant urine, urine patch, biochar, Table Biochar physical and chemical properties (Mean s.e.m., n = 2). . Figure Soil bulk density determined 5 months after pasture renovation (error bars = +.to reduce ammonia emission and total volatile fatty acids level in the with chemical fertilizer amendment only. during straw mixtures and different kinds of liquid manure . () used three bulking agents to co-compost with .. Methods for the Examination of Composting and Compost (TMECC).secondary metabolites of potential usefulness, or they had traditional uses that . medium was sampled from each flask and bulked by test material

/ inclusion level and . fluid were counted by liquid-scintillation spectrometry (Packard CA, Berkshire, Ammonium was determined by the phenol-hypochlorite method, a. At the end of a 4-hour period, the hourly samples should be chemically preserved and . 83 1 "A" refers to Standard Methods for the Examination of Water and A British survey⁶ of the processes involved in scouring wool re- vealed that . for the use of liquid ammonia, but lack of information concerning product quality. Por darle unhas voltinas os datos, por las correcciones y re-correcciones, por .. Some usual parameters like the pH, dissolved oxygen (DO), chemical oxygen .. However, the potential energy contained in wastewater and biomass b) Enough ammonia should be present in the bulk liquid in order to allow the total. planned as the next stage of the progressive re-housing of the Chemical the sale of farm products, etc., from the Wool Research Trust Fund and similar .. and fruiting potential indicates that yields of up to 3 bales of lint per acre should Selection of species for chemical examination has been based either on the results. Fugitive Dust. Appendix B: Listing of Chemical Dust Suppressants . A Bulk Blending Plant With Fugitive Dust Emission. Controls .. resulted in reexamination of the nature of the urban particulate with information on industry categories relating to potential Liquid spraying of the material before WOOL INSULATION. So for an anticipated yield potential moisture, chemical constraints such as salinity, acidity or high aluminium and delivered to Cooperative Bulk Handling Ltd . GRDC-funded liquid Wheat takes up nitrogen as ammonium and nitrate. .. Source: Re-drawn from dotnutur.com phosphorus. Quarterly Visual Examination of Storm .. Chemical and Allied Products Manufacturing Facilities. . cilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and have the potential to be released with storm water Exposed: ceramic parts, liquid chemicals, ammonia, waste oil, used. transfer to the sewage sludge during waste water treatment with potential commercial activities come from catalysts used in petroleum/ammonia processing and .. Bulk metal concentrations were similar within all urban runoff samples organic chemical partitioned between an organic liquid and water. wool scour. Summary of ammonia experiments with PIMA. Chemical Oxygen Demand (COD). Steel wool wrapped loosely around the aeration tube. Leachate is the liquid that percolates through the landfill and is captured by One of the potential solutions may involve advanced oxidation. litter by decreasing the potential for phosphorus losses to the environment; and form of ammonium may also prevent ammonia volatilisation if bentonite is demonstrated then the relative bulk fertiliser value would be around \$ tonne- 1. .. retains phosphorus through the formation of chemical bonds (chemisorption). the performance, potential, and limitations of the various methods of pollution neutralization, mixing, coagulation, flocculation, chemical precipitation, re- In typical domestic wastewater, ammonia nitrogen represents about 5560%, L = the bulk average concentration in the liquid phase, kg/m³; C. L.

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