

REFERENCES

- ADLEM, C.J.L. 1991. Recovery of CaCO₃ in the Barium Processes. Internal Report. Division of Water Technology. CSIR. September.
- APHA, 1985. *Standard Methods for the Examination of Water and Wastewater Treatment*. Twelfth Edition, American Public Health Association, New York.
- ARMENTIA, H and WEBB, C. 1992. Ferrous sulphate oxidation using *Thiobacillus ferrooxidans* cells immobilised in polyurethane foam support particles, Appl. Microbiol. Biotechnol. **36**: 697-700.
- ATKINSON, B., BLACK, G.M., LEWIS P.S.J and PINCHES, A. 1978. British patent 38267/78 and similar foreign patents.
- ATKINSON, B., BLACK, G.M and PINCHES, A. 1980. Process intensification using cell support systems. Process Biochem. **15**: 24-32.
- BARNES, H.L. and ROMBERGER, S.B. 1968. Chemical aspects of acid mine drainage. Journal WPCF. March. 371-384.
- BARRON, J.L. and LUECKING, D.R. 1990. Growth and maintenance of *Thiobacillus ferrooxidans* cells, Appl. Environ. Microbiol. **56 (9)**: 2801-2806.
- BOCK, A., PRIEGER-KRAFT, A. and SCHONHEIT, P. 1994, Puryvate, a novel substrate for growth and methane formation in *Methanosarcina barkeri*. Arch. Microbiol. **161**: 33-46.
- BOSMAN, D.J., CLAYTON, J.A., MAREE, J.P. and ADLEM, C.J.L. 1990. Removal of Sulphate from Mine Water with Barium Sulphide. Proceedings of the Lisboa 90 International Symposium. Acid Mine Water in Pyritic Environments. Lisbon Portugal, 16-19 September.

BROCK, T.D. and MADIGAN, M.T. 1991. Biology of Microorganism, 6th Edition, Prentice-Hall, Inc.

BUCHANAN, R.E. and GIBBONS, N.E. 1974. Bergey's Manual of Determinative Bacteriology, 8th Edition, Williams & Wilkins, Baltimore.

CHAMBER OF MINES RESEARCH ORGANISATION, 1988. New desalination programme on stream. R & D NEWS CM. October.

CHARACKLIS, W.G. and MARSHALL, K.C. 1990. Biofilm, New York, Wiley London, p796.

CHEMEFFCO. GYP-CIX Brochure. (undated).

COLMER, A.R., TEMPLE, K.T and HINKLE, M.E. 1947. An iron oxidising bacterium from the acid mine drainage of some bituminous coal mines, J. Bacteriol. **59**: 317–328.

DU PREEZ, L.A. and MAREE, J.P. 1994. Pilot scale biological sulphate and nitrate removal utilizing producer gas as energy source. Seventh International Symposium on Anaerobic Digestion. 190-204.

GRISHIN, S.I and TUOVINEN, O.H. 1988. Fast kinetics of Fe²⁺ oxidation in packed-bed reactor, Appl. Environ. Microbiology. **54 (12)**: 3101-3106.

GUAY, R., SILVER, M. and TORMA, A.E. 1977. Ferrous oxidation and uranium extraction by *Thiobacillus ferrooxidans*. Biotech. Bioeng. **19**, 727-740.

HALFMEIER, H., SCHAFFER-TREFFENFELDT, W and REUS M. 1993. Potential of *Thiobacillus ferrooxidans* for waste gas purification: Part 2. Increase in continuous ferrous iron oxidation kinetics using immobilised cells, Appl. Microbiol. Biotechnol. **40**: 582 –587.

HOEHN, R.C. and SIZEMORE, D.R. 1977. Acid mine drainage and its impact on a small Virginia stream. *Water Resources Bulletin*. **13 (1)**: 153-159.

HOLUIGUE, L., HERRERA, L., PHILIPS, O.M., YOUNG, M. and ALLENDE, J.E. 1987. CO₂ fixation by mineral-leaching bacteria: characteristics of the ribulose biphosphate carboxylase- oxygenase of *Thiobacillus ferrooxidans*, *Biotechnl. Appl. Biochem.* **9**: 497-505.

JUBY, G.J.C., NARRIES, R.C. and GEIG, J.D. 1985. Improving the quality of mine service waters in gold mines in South Africa. *Proceedings 2nd Int. Mine Water Association Congress*. 353-363.

KARAMANEV, D.G. and NIKOLOV, L.N. 1988. Influence of some physicochemical parameters on bacterial activity of biofilm: ferrous iron oxidation by *Thiobacillus ferrooxidans*, *Biotechnnol. Bioeng.* **31**: 295-299.

KELLY, D.P. and JONES, C.A. 1978. Factors affecting metabolism and ferrous iron oxidation in suspensions and batch culture of *Thiobacillus ferrooxidans*: relevance to ferric iron leach solution regeneration, in: L.E. Murr, A.E. Torma, J.A. Brierly (Eds.). *Metallurgical Applications of Bacterial Leaching and Related Microbiological Phenomena*, Academic press, New York, 19-43.

KLEINMANN, R.L.P and CRERAR, D.A. 1979. *Thiobacillus ferrooxidans* and the formation of acidity in simulated coal mine environments. *Geomicrobiol.* **J.4**: 373-388.

LANCY, E.D. and TUOVINEN, O.H. 1984. Ferrous iron oxidation by *Thiobacillus ferrooxidans* immobilised in calcium alginate, *Appl. Microbiol. Biotechnol.*, **20**, 94-99.

LOI, G., MURA, A., PASSARINI, N., TROIS, P and ROSSI G. 1993. Modification of oxidising activity of *Thiobacillus ferrooxidans* by some particulate solids. **Fuel 72**: 1607-1611.

LUNDGREN, D.G., VESTAL, J.R. and TABITA, F.R. 1972. The microbiology of mine drainage pollution, pp 69-88. In R. Mitchell (ed.), *Water pollution microbiology*. John Wiley and Sons, New York.

MACDONALD, D.G. and CLARK, R.H. 1970. The oxidation of aqueous ferrous sulphate by *Thiobacillus ferrooxidans*, *Can. J. Chem. Eng.* **48**: 669-676.

MADIGAN, M.T., MARTINKO, J.M. and PARKER, J. 1997. *Biology of Microorganism*, 8th Edition, Prentice-Hall, Inc.

MAREE, J.P., BOSMAN, D.J. and JENKINS, G.R. 1989. Chemical removal of sulphate calcium and heavy metals from mining and power station effluents. *Water Sewage and Effluent*. September, **(9) 3**: 10-25.

MAREE, J.P., DINGEMANS, D., VAN TONDER, G.J. and MTIMKULU, S. 1998a. Biological iron (II) oxidation as pre-treatment to limestone neutralization of acid water, *Proc. of the IAWQ 19th Biennial International Conference*, Vancouver, Canada, 21-26 June.

MAREE, J.P. and DU PLESSIS, P. 1994. Neutralization of acidic effluents with limestone. Report 136/1/89 to the Water Research Commission by the Division of Water Technology, CSIR.

MAREE, J.P., LEBWITZ, A. and DODS, D. 1990. Sulphate wastes. Rustenburg Symposium.

MAREE, J.P., STRYDOM, W.F. and DE BEER, M. 1999. Integrated iron (II) oxidation and limestone neutralisation of acid mine water, *Proceedings of the International Association on Water Quality (IAWQ), Specialised Conference on Chemical Process*

Industries and Environmental Management, Cape Town, South Africa, 6 - 10 September.

MAREE, J.P., VAN TONDER, G.J. and GUNTHER, P. 1998b SAIM, *Proceedings of the 1998 Conference of the SAIM*, Johannesburg, 15 July.

MAREE, J. P., VAN TONDER, G.J., MILLARD, P. and ERASMUS, T.C. 1996. Pilot scale neutralisation of underground mine water. *Water Science and Technology*. Vol. **34**: No. 10, 141-149.

NAKAMURA, K., NOIKE, T. and MATSUMOTO, J. 1986. Effect of operation conditions on biological Fe²⁺ oxidation with rotating biological contactors, *Water Res.*, **20**(1), 73-77.

NEMATI, M., HARRISON, S.T.L., HANSFORD, G.S. and WEBB, C. 1998. Biological oxidation of ferrous sulphate by *Thiobacillus ferrooxidans*: a review on the kinetic aspects, *Biochemical Engineering Journal*, 171 – 190.

NEMATI, M. and WEBB, C. 1995. Kinetics of continuous oxidation of ferrous sulphate in a packed-bed bioreactor. ICHIME Research event. Edinburgh. IchemE Rugby. **2**: 1028-1030.

NEMATI, M. and WEBB, C. 1996. Effect of ferrous iron concentration on the catalytic activity of immobilized cells of *Thiobacillus ferrooxidans*. *App. Microbiology Biotechnology*. **46**: 250-255.

NEMATI, M. and WEBB, C. 1997. A kinetic model for biological oxidation of ferrous iron by *Thiobacillus ferrooxidans*, *Biotechnol. Bioeng.* **53**: 478-486.

NEMATI, M. and WEBB, C. 1998. Ferrous sulphate oxidation by combined biological and chemical catalysis using *Thiobacillus ferrooxidans* immobilized in activated carbon coated biomass support particles, *Biotechnology Progress* (submitted for publication).

NEMATI, M. and WEBB, C. 1999. Combination biological chemical oxidation of ferrous sulphate using immobilised *Thiobacillus ferrooxidans*. J. Chem. Technol. Biotechnol. **74**: 562-570.

NIKOLOV, L.N., MEHOCHEV, D. and DIMITROV, D. 1986. Continuous bacterial ferrous iron oxidation by *Thiobacillus ferrooxidans* in rotating biological contactors, Biotechn. Lett., 8(10), 707-710.

OLEM, H. and UNZ, R.F. 1977. Acid mine drainage treatment with rotating biological contactors, Biotechnol. Bioeng., **19**, 1475-1491.

OSUCHOWSKI, R. 1992. Advanced treatment of acid mine water. Technology S.A, April, 9 -11.

PULLES, W. 2000. Development of passive mine water treatment technology. Proceeding Y2K Millennium Meeting, Grahamstown 23 - 28 January, 600-601.

SILVERMAN, M.P. 1967 Mechanisms of bacterial pyrite oxidation. J. Bacteriol. **94**: 1046– 105.

SILVERMAN, M.P., and LUNGREN, D.G. 1959. Studies on the chemoautotrophic iron bacterium *Thiobacillus ferrooxidans*. An improved medium and harvesting procedure for securing high cell yields. J. Bacteriol. **77**: 642-649.

SMITH, J.R., LUTHY, G.R. and MIDDLETON, A.C. 1988. Microbial ferrous iron oxidation in acidic solution, J. Water Pollut. Control Fed. **60 (4)**: 518-530.

SOUTH AFRICA DEPARTMENT OF MINERALS, Annual Report, 1998.

STUMM, W and LEE, G.F. 1961. Oxygenation of ferrous iron. *Industrial and Engineering Chemistry*, **53 (2)**: 143 - 146.

THOMAS, B.A. 1970. Planning of gold mines to minimize water pollution problems at closure. Convention: Water for the future. 1-6.

THOMPSON, J.G. 1980. Acid mine waters in South Africa and their amelioration. *Water S.A.* **6**:130 –134.

VOGEL, A.I. 1989. Vogel's textbook of quantitative chemical analysis, 5th Edition, Longman, London.

VOLMAN, R. 1984. The use of barium sulphide to remove sulphate from industrial effluents. M.Sc. Thesis (Chem. Eng.), University of Stellenbosch.

WAGNER, J.C. and VAN NIEKERK, A.M., 1987. Quality and treatment of effluents originating from mine and municipal waste sites. Proceedings of the International Conference on Mining and Industrial Waste Management. Johannesburg, 283-286.

WALSH, F. 1978. Biological control of acid mine drainage, 377-389, John Wiley and Sons, New York.

WEBB, C. and DERVAKOS, G.A. 1996. Studies in viable cell immobilization. Academic Press, London.