The International Kinetic Database (IKD$^{©,TM}$) (scroll down for more details)

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Minesite Drainage Assessment Group (MDAG)^{TM}

Introduction

The International Kinetic Database (IKD$^{©,TM}$) is a compilation of results from geochemical kinetic tests, namely humidity cells, leach columns, and minewall stations. These tests are discussed and illustrated in great detail in the book, *Environmental Geochemistry of Minesite Drainage: Practical Theory and Case Studies*.

The purpose of the IKD is to allow comparisons of a minesite's geochemical rates, like the rate of acid generation or copper leaching, to rates from several dozens of other minesites around the world. From statistical tables or scatterplots that you can create, it becomes apparent whether your site's rates are unusually low or high, or relatively common. Additionally, rates can be labelled as "very low", "low", "moderate", "high", or "very high" (e.g., see Figures 1 and 2 below).

The IKD contains summary data from geochemical tests (Table 1 below) that have been submitted to government agencies and the public around the world by many mining companies. As a result, we do not own the data, but we have compiled the results of the tests for inclusion in this database. Therefore, our copyright covers the summary results, the compilation, and the database.

What's in the IKD?

The IKD contains the values and statistics for each parameter listed in Table 1 below, when available from the original references. For the current version, the IKD contains the results of 543 humidity cells from 72 minesites around the world, 71 columns from 12 minesites, and 37 minewall stations from seven minesites. As explained in *Environmental Geochemistry of Minesite Drainage: Practical Theory and Case Studies*, columns are not standardized and often not appropriate for measuring primary-mineral reaction rates. As a result, the IKD does not focus on them.

The names of the minesites and the names of the samples are not given, but are replaced by a simple substitute, like

"Mine 1". These names are not needed for creating comparisons like scatterplots and numerical ranges.

How to Obtain a Copy of the IKD

Go to the top of this page, and click on the button saying "Buy Now".

Relevant References

    The IKD has been in use for several years. You can find it discussed in our publications as well as in several reports that some mining companies have submitted to government agencies around the world. For example:

Morin, K.A., and N.M. Hutt. 2004. The Minewall Approach for estimating the geochemical effects of mine walls on pit lakes. Presented at Pit Lakes 2004; United States Environmental Protection Agency; Reno, Nevada; November 16-18, 2004.

 Morin, K.A., and N.M. Hutt. 2001. *Environmental Geochemistry of Minesite Drainage: Practical Theory and Case Studies, Digital Edition*. MDAG Publishing, Vancouver, Canada. ISBN 0-9682039-1-4.

Morin, K.A., and N.M. Hutt. 2000. Lessons learned from long-term and large-batch humidity cells. IN: Proceedings from the Fifth International Conference on Acid Rock Drainage, May 20-26, Denver, USA, Volume I, p. 661-671. Society for Mining, Metallurgy, and Exploration, Inc., Littleton, CO, USA.

Morin, K.A., and N.M. Hutt. 1999. Prediction of water chemistry in acid mine lakes: the Minewall approach. Ecology of Post-Mining Landscapes, Brandenburgische Technische Universität Cottbus, Cottbus, Germany, March 15-19.

Morin, K.A., and N.M. Hutt. 1998. Kinetic tests and risk assessment for ARD. Presented at the 5th Annual British Columbia Metal Leaching and ARD Workshop, 9-10 December 1998, Vancouver, British Columbia, Canada, British Columbia Ministry of Energy and Mines.

Morin, K.A., and N.M. Hutt. 1997. *Environmental Geochemistry of Minesite Drainage: Practical Theory and Case Studies*. MDAG Publishing, Vancouver, Canada. ISBN 0-9682039-0-6.

Morin, K.A., N.M. Hutt, and K.D. Ferguson. 1996. The International Kinetic Database: Rates of acid generation, neutralization, and metal leaching from mines around the world. IN: Proceedings of the 3rd International and 21st Annual Minerals Council of Australia Environmental Workshop, October 14-18, Newcastle, New South Wales, Australia, Volume 1, p.132-148.

Morin, K.A., N.M. Hutt, and K.D. Ferguson. 1995. Measured rates of copper and zinc leaching in the International Kinetic Database. IN: Proceedings of the 19th Annual British Columbia Mine Reclamation Symposium, Dawson Creek, B.C., June 19-23, p.255-263.

Morin, K.A., N.M. Hutt, and K.D. Ferguson. 1995. Measured rates of sulfide oxidation and acid neutralization in humidity cells: Statistical lessons from the database. IN: Proceedings of the Conference on Mining and the Environment, Sudbury, Ontario, May 28 - June 1, Volume 2, p.525-536.
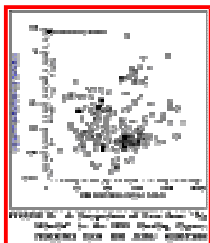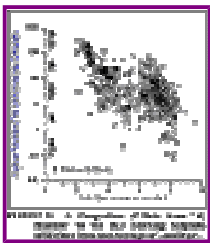
  Click on Figures 1 and 2 to enlarge them.

TABLE 1

Contents of the IKD$^{©,TM}$ by Column

(Note: a particular test may not have a value for one or more of the parameters if they were not provided in the original reference)

Column	Column Content
Miscellaneous and Pre-Test Information	
A	MINE LABEL
B	SAMPLE LABEL
C	TYPE OF TEST
D	SAMPLE MATERIAL
E	DURATION OF TEST (WEEKS)
F	SURFACE AREA (m2/kg)
G	SULPHUR TOTAL (%S)
H	SULPHIDE (%S)
I	%S for BALANCE CALCULATION
J	NP (t/1000 t)
K	CARBONATE NP (t/1000 t)
L	NP for BALANCE CALCULATION
M	PASTE pH
N	NET NEUTRALIZATION POTENTIAL (t/1000 t)
O	NET POTENTIAL RATIO
P	Initial Cu (mg/kg)
Q	Initial Zn (mg/kg)
Statistics For Entire Test Period	
R	LOWEST MEASURED pH
S	HIGHEST MEASURED pH
T	SULPHATE RATE (mg SO_4/kg/wk)
U	ACIDITY RATE (mg $CaCO_3$/kg/wk)

V	ALKALINITY RATE (mg $CaCO_3$/kg/wk)
W	CARBONATE NP RATE (mg $CaCO_3$/kg/wk)
X	MOLAR RATIO: $(Ca+Mg)/SO_4$
Y	MOLAR RATIO: $(Ca+Na/2+K/2)/SO_4$
Z	COPPER PRODUCTION RATE: (mg Cu/kg/wk)
AA	ZINC PRODUCTION RATE: (mg Zn/kg/wk)
Statistics for Late-Stage Period	
AB	NO. OF WEEKS USED IN LATE-STAGE CALCULATIONS
AC	AVERAGE pH
AD	SULPHATE RATE (mg SO_4/kg/wk)
AE	ACIDITY RATE (mg $CaCO_3$/kg/wk)
AF	ALKALINITY RATE (mg $CaCO_3$/kg/wk)
AG	CARBONATE NP RATE (mg $CaCO_3$/kg/wk)
AH	MOLAR RATIO: $(Ca+Mg)/SO_4$
AI	MOLAR RATIO: $(Ca+Na/2+K/2)/SO_4$
AJ	COPPER PRODUCTION RATE: (mg Cu/kg/wk)
AK	ZINC PRODUCTION RATE: (mg Zn/kg/wk)

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