

CONTENTS

Acknowledgements	V
Thoughts and Reminiscences on Experimental Trace Element Partitioning	147
Abstract	147
1. Introduction	148
1.1 A Starting Point	148
1.2 Definitions	149
1.3 A Simple Equation for D vs. Temperature	150
1.4 Henry's Law	151
2. Trace Element Partitoning in the 1970's	153
2.1 Percent Level Doping	153
2.2 Beta Radiography and Henry's Law	154
2.3 Fission Track Analysis	156
2.4 Partitioning Between Immiscible Liquids	157
2.5 Onuma Diagrams	157
2.6 Crystal Field Effects	158
2.7 The 1977 Sedona Conference	160



2.8	An Aside: Graduate School Applications	161
3.	Trace Element Partition Heading into the 1980's	163
3.1	The Influence of Don Burnett	163
3.2	What I Really Wanted to do for My Thesis	164
3.3	Clair Patterson	165
3.4	Combined Beta Radiography and Fission-Track Analyses	166
3.5	Some Minor Lab Issues	167
3.6	Mike Drake	168
3.7	A Letter of Reference	169
3.8	Looking for a Real Job	169
4.	Tucson Days: Part I (Mostly Silicate)	171
4.1	An Excursion into Metal Partitioning	171
4.2	A Personal Note	171
4.3	Olivine/Liquid Partition Coefficients (Part I)	171
4.4	Olivine/Liquid Partition Coefficients (Part II)	176
4.5	Olivine/Liquid Partition Coefficients (Part III): Quickly "Apparating" to the Future	178
4.5.1	The thermodynamics of D <i>vs.</i> D diagrams	178
4.5.2	Beattie refinements	179
4.5.3	Mg# refinements	179
4.5.4	Effect of pressure	179
4.5.5	Effect of TiO ₂	180
4.5.6	The incompatibility of compatible elements	180
4.6	Toward a World-View of Trace Element Partitioning in Igneous Silicate Systems	181
4.6.1	Thermodynamics of solidification	182
4.6.2	Phase diagram analogues to incompatible trace element partitioning	182
4.6.3	Heats of reaction <i>vs.</i> heats of fusion	183
4.6.4	Heats-of-mixing in silicate liquids	184
4.6.5	Entropy of mixing at infinite dilution	185
4.6.6	Condensation from the solar nebula	185
4.6.7	Jones and Burnett (1987)	185
4.7	Subsolidus Partitioning	188
4.8	A Short Critique of Traditional Petrologic Thermodynamics	189
5.	Tucson Days: Part II (Mostly Metal)	191
5.1	Partitioning in the Fe-Ni-X(Tracer) System	191
5.2	Partitioning in the Fe-Ni-S-X(Tracer) ± P System	192
5.3	Meddling with Metallurgists	193
5.4	Soret Effect in Metallic Systems	196
5.5	Dave Walker	197



6.	Tucson Days: Part III (Core Formation)	199
6.1	Partitioning between Metals and Silicate Liquid	199
6.1.1	On being too careful.	200
6.2	Jones and Drake (1986)	201
6.3	The Giant Impact Model for the Moon	203
7.	Miscellaneous 1980's Stuff	205
7.1	Alkali Volatility	205
7.2	Partitioning between Pt Metal/Silicate Liquid, and More Nucleation Issues	205
7.2.1	Experimental consequences of Pt (in)stability	206
7.2.2	Condensation in the early solar nebula.	206
7.2.3	An experimental serendipity	207
7.3	Gordon McKay.	207
7.4	Partitioning in Very Reducing Systems.	209
7.5	Markov Chain Models of Partitioning	209
8.	The 1990's	210
8.1	Rama Murthy	210
8.2	Fe-Ni-S at Low Temperature	210
8.3	Dave Lindstrom.	211
8.4	Sc Partitioning	212
8.5	Carbonate-Silicate Partitioning.	214
8.6	A Review Paper	216
8.7	Xenon Partitioning	218
8.8	Paul Beattie.	219
8.8.1	Henry's law	219
8.8.2	Partitioning of elements with low D	219
8.8.3	Olivine partitioning	220
8.9	Blundy and Wood	220
8.10	Ben Hanson, Cr Partitioning, and Reusing Pt Loops	220
8.11	Alex Borisov and Rhenium Loops.	221
9.	The 2000's	223
9.1	Nancy Chabot and Metals.	223
9.1.1	Immiscible liquids.	223
9.1.2	Parameterisations in metallic systems	224
9.1.3	Henry's law	225
9.1.4	Partitioning at high pressure	225
9.2	Dave Lindstrom and Nanonuggets	226
9.3	Valerie Malavergne and Pt Partitioning	227

