

# Matrix Effects?

- Effects from Water By Difference
- Effects from Na, Si, etc “migration”

# Matrix Effects

24H-1-1

No Volatile Correction, No Water By Difference

Results in Oxide Weight Percents

ELEM:	CaO	K2O	FeO	SiO2	MgO	Na2O	Al2O3	TiO2	P2O5	O	H2O	SUM
58	.411	4.900	.537	74.603	.036	2.644	11.975	.073	.000	.000	.000	95.180
59	.437	4.624	.612	75.386	.033	1.841	12.024	.113	.000	.000	.000	95.070
60	.423	4.998	.526	74.715	.023	2.765	12.113	.065	.000	.000	.000	95.628
61	.423	4.853	.637	75.000	.047	2.137	12.089	.055	.000	.000	.000	95.240
62	.435	4.847	.677	74.613	.048	2.561	12.089	.036	.011	.000	.000	95.317
<b>AVER:</b>	<b>.426</b>	<b>4.844</b>	<b>.598</b>	<b>74.863</b>	<b>.037</b>	<b>2.390</b>	<b>12.058</b>	<b>.068</b>	<b>.002</b>	<b>.000</b>	<b>.000</b>	<b>95.287</b>
<b>SDEV:</b>	<b>.011</b>	<b>.137</b>	<b>.065</b>	<b>.333</b>	<b>.010</b>	<b>.387</b>	<b>.057</b>	<b>.028</b>	<b>.005</b>	<b>.000</b>	<b>.000</b>	
<b>%RSD:</b>	<b>2.5</b>	<b>2.8</b>	<b>10.8</b>	<b>.4</b>	<b>27.9</b>	<b>16.2</b>	<b>.5</b>	<b>41.5</b>	<b>223.6</b>	<b>418.3</b>	<b>.0</b>	
<b>ZCOR:</b>	<b>1.1202</b>	<b>1.1536</b>	<b>1.1987</b>	<b>1.2061</b>	<b>1.4303</b>	<b>1.8227</b>	<b>1.2568</b>	<b>1.1983</b>	<b>1.4641</b>	<b>.0000</b>	<b>.0000</b>	
<b>KRAW:</b>	<b>.0161</b>	<b>.3080</b>	<b>.0057</b>	<b>1.0344</b>	<b>.0003</b>	<b>.1323</b>	<b>.7242</b>	<b>.0006</b>	<b>-.0004</b>	<b>.0000</b>	<b>.0000</b>	
<b>PKBG:</b>	<b>4.96</b>	<b>59.36</b>	<b>4.84</b>	<b>370.59</b>	<b>1.42</b>	<b>30.93</b>	<b>77.40</b>	<b>1.46</b>	<b>.87</b>	<b>.00</b>	<b>.00</b>	

Excel Spreadsheet Subtraction Gives ~ 4.7% H2O

# Volatile Correction Matrix Effects

24H-1-1

With Volatile Correction, No Water By Difference

Results in Oxide Weight Percents

ELEM:	CaO	K2O	FeO	SiO2	MgO	Na2O	Al2O3	TiO2	P2O5	O	H2O	SUM
58	.411	4.867	.537	74.378	.037	3.626	12.035	.030	.000	.000	.000	95.921
59	.437	4.740	.612	75.016	.034	2.426	12.063	.194	.000	.000	.000	95.521
60	.423	4.933	.526	74.057	.024	3.805	12.178	.076	.000	.000	.000	96.022
61	.423	5.220	.636	74.552	.048	3.025	12.147	.077	.000	.000	.000	96.128
62	.435	4.715	.677	74.794	.049	3.503	12.146	.048	.011	.000	.000	96.378
<b>AVER:</b>	<b>.426</b>	<b>4.895</b>	<b>.598</b>	<b>74.559</b>	<b>.038</b>	<b>3.277</b>	<b>12.114</b>	<b>.085</b>	<b>.002</b>	<b>.000</b>	<b>.000</b>	<b>95.994</b>
SDEV:	.011	.203	.065	.370	.010	.557	.062	.064	.005	.000	.000	
%RSD:	2.5	4.1	10.8	.5	27.3	17.0	.5	75.6	223.6	.0	.0	
<b>ZCOR:</b>	<b>1.1198</b>	<b>1.1530</b>	<b>1.1983</b>	<b>1.2092</b>	<b>1.4391</b>	<b>1.8180</b>	<b>1.2625</b>	<b>1.1979</b>	<b>1.4627</b>	<b>.0000</b>	<b>.0000</b>	
KRAW:	.0161	.3114	.0057	1.0276	.0003	.1819	.7242	.0008	-.0004	.0000	.0000	
PKBG:	4.97	60.00	4.84	369.28	1.43	42.09	77.77	1.58	.87	.00	.00	
<b>VOL%:</b>	<b>.000</b>	<b>1.135</b>	<b>.000</b>	<b>-.658</b>	<b>.000</b>	<b>36.111</b>	<b>.000</b>	<b>20.283</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	
DEV%:	.0	.2	.0	.0	.0	.4	.0	20.3	.0	.0	.0	

Na, Si, K Intensity Over Time Iteration Gives ~ 4% H2O

# Water By Difference Matrix Effects

24H-1-1

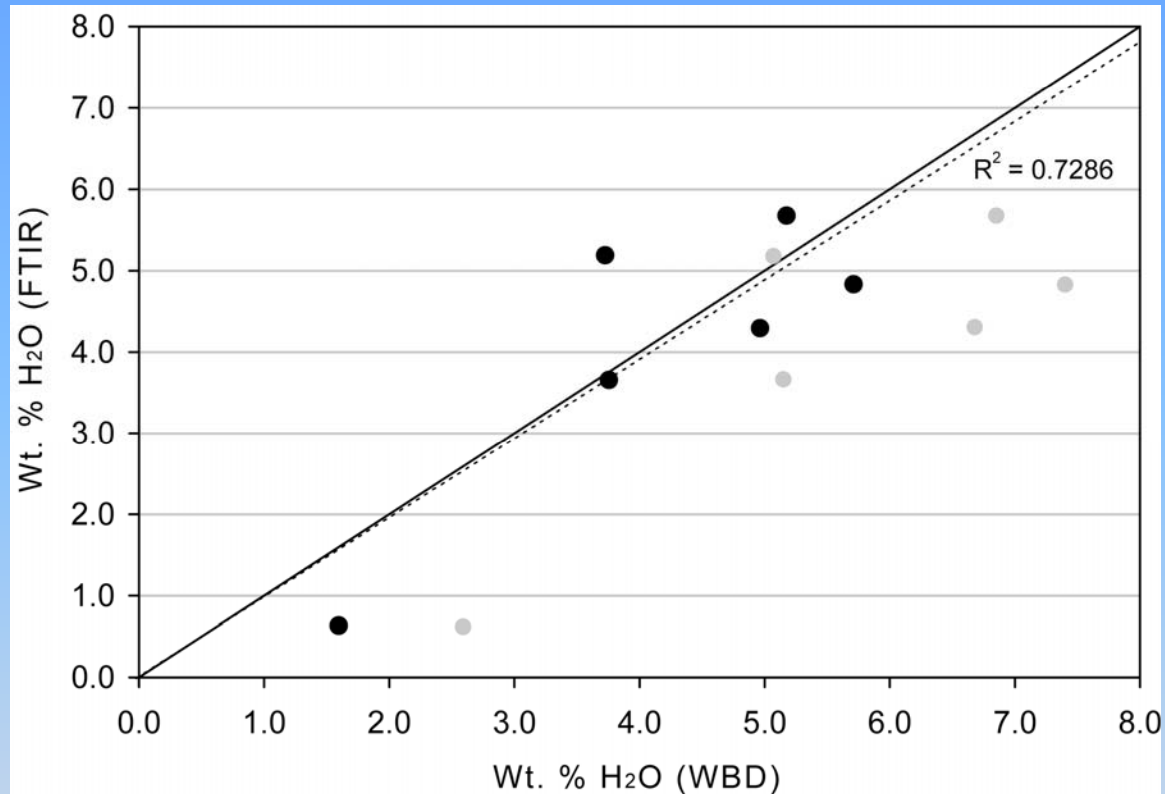
With Volatile Correction, Water By Difference

Results in Oxide Weight Percents

ELEM:	CaO	K2O	FeO	SiO2	MgO	Na2O	Al2O3	TiO2	P2O5	O	H2O	SUM
58	.414	4.885	.542	74.776	.039	3.668	12.139	.030	.000	.000	3.506	100.000
59	.441	4.759	.618	75.464	.036	2.457	12.181	.195	.000	.000	3.849	100.000
60	.426	4.951	.531	74.441	.026	3.848	12.281	.076	.000	.000	3.420	100.000
61	.426	5.239	.641	74.934	.050	3.058	12.249	.077	.000	.000	3.327	100.000
62	.438	4.730	.682	75.149	.051	3.539	12.240	.048	.011	.000	3.112	100.000
<b>AVER:</b>	<b>.429</b>	<b>4.913</b>	<b>.603</b>	<b>74.953</b>	<b>.041</b>	<b>3.314</b>	<b>12.218</b>	<b>.085</b>	<b>.002</b>	<b>.000</b>	<b>3.443</b>	<b>100.000</b>
SDEV:	.011	.203	.065	.385	.010	.562	.057	.065	.005	.000	.270	
%RSD:	2.5	4.1	10.8	.5	25.7	16.9	.5	75.6	223.6	-104.6	7.9	
<b>ZCOR:</b>	<b>1.1241</b>	<b>1.1571</b>	<b>1.2053</b>	<b>1.2156</b>	<b>1.4515</b>	<b>1.8372</b>	<b>1.2731</b>	<b>1.2037</b>	<b>1.4591</b>	<b>.0000</b>	<b>.0000</b>	
KRAW:	.0161	.3114	.0057	1.0276	.0004	.1821	.7244	.0008	-.0004	.0000	.0000	
PKBG:	5.03	60.00	4.89	372.20	1.46	43.35	78.99	1.58	.87	.00	.00	
VOL%:	.000	1.135	.000	-.658	.000	36.111	.000	20.283	.000	.000	.000	
DEV%:	.0	.2	.0	.0	.0	.4	.0	20.3	.0	.0	.0	

Both Na, Si, K Change and Water By Difference Gives 3.4% H2O

# Water By Difference vs. FTIR



Comparison of melt inclusion water contents measured by FTIR in sub-micron melt inclusion water contents estimated as the difference between 100% and microprobe analysis totals or “water by difference” (WBD).

Solid diagonal line indicates 1:1 correspondence, dashed line is a linear regression fixed at the origin. Gray symbols show WBD water content before matrix correction of the analysis and black symbols show matrix-corrected WBD estimates.

From Roman, 2003