**Table S6.** Contents of major (wt.%) elements in the magmatic rocks of the Burgali ore field

| Sample | Rock | $SiO_2$ | $TiO_2$ | $Al_2O_3$ | $Fe_2O_3$ | FeO | MnO | MgO | CaO | $Na_2O$ | $K_2O$ | $P_2O_5$ | $H_2O^-$ | $H_2O^+$ | F | $Li_2O$ | $Rb_2O$ | $Cs_2O$ | S | Total | f% | T°C | P, kb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Levo-Dzholokag massif | | | | | | | | | | | | | | | | | | | | | | | |
| 299 | quartz diorite | 58.50 | 0.49 | 17.50 | 1.16 | 1.62 | 0.16 | 3.04 | 5.01 | 3.45 | 2.84 | 0.19 | - | 4.28 | 0.09 | 0.019 | 0.023 | 0.008 | 0 | 98.38 | 46.3 | 899 | 15 |
| 602/2 | granodiorite | 64.62 | 0.50 | 15.94 | 1.91 | 3.61 | 0.11 | 1.78 | 4.71 | 3.36 | 1.78 | 0.10 | - | 0.70 | 0.09 | 0.013 | 0.009 | - | 0 | 99.23 | 74.9 | 909 | 10 |
| 602/1 | « | 66.44 | 0.39 | 16.99 | 1.69 | 1.63 | 0.08 | 0.90 | 3.99 | 3.64 | 2.79 | 0.11 | - | 0.47 | 0.08 | 0.0085 | 0.007 | - | 0.07 | 99.28 | 77.7 | 879 | 11 |
| 2004/5 | « | 66.85 | 0.52 | 15.92 | 1.63 | 3.32 | 0.06 | 1.01 | 3.79 | 3.17 | 3.25 | 0.09 | 0.12 | 0.56 | 0.10 | 0.0046 | 0.0109 | - | 0.05 | 100.44 | 82.5 | 1012 | 9.7 |
| 2005/2 | « | 67.32 | 0.43 | 16.28 | 0.77 | 2.96 | 0.05 | 0.79 | 3.69 | 3.32 | 3.11 | 0.09 | 0.20 | 0.25 | 0.09 | 0.008 | 0.01 | - | 0.02 | 99.19 | 82.2 | 985 | 9.9 |
| 296 | « | 68.00 | 0.35 | 15.05 | 0.24 | 3.58 | 0.07 | 1.29 | 3.24 | 3.38 | 3.10 | 0.10 | - | 0.58 | 0.06 | 0.01 | 0.02 | 0.002 | 0.03 | 99.10 | 74.6 | 880 | 8.3 |
| 2005/1 | granite | 68.34 | 0.37 | 15.75 | 1.89 | 1.61 | 0.08 | 0.62 | 3.60 | 3.16 | 3.35 | 0.08 | - | 0.62 | 0.05 | 0.0096 | 0.011 | 0 | 0 | 99.54 | 84.2 | 881 | 9 |
| 2132/6 | « | 68.94 | 0.33 | 14.52 | 0.32 | 3.10 | 0.05 | 0.88 | 2.71 | 3.53 | 4.18 | 0.07 | 0.18 | 0.88 | 0.08 | 0.0085 | 0.011 | 0 | 0 | 99.61 | 79.3 | 878 | 7.5 |
| 165 | « | 69.50 | 0.30 | 15.20 | 0.05 | 3.23 | 0.05 | 0.81 | 3.03 | 3.40 | 3.49 | 0.08 | - | 0.12 | 0.04 | 0.0104 | 0.013 | 0.001 | 0 | 99.32 | 80.1 | 862 | 8 |
| Leucogranite | | | | | | | | | | | | | | | | | | | | | | | |
| 302 | leucogranite | 70.90 | 0.02 | 15.50 | 0.85 | 0.72 | 0.01 | 0.16 | 1.12 | 4.22 | 6.05 | 0.18 | - | 0.20 | 0.02 | 0.003 | 0.02 | 0.002 | 0.03 | 100.00 | 90.3 | 548 | 9 |
| 304 | « | 74.80 | 0.02 | 13.85 | 0.19 | 0.56 | 0.01 | 0.13 | 0.94 | 4.10 | 5.17 | 0.19 | - | 0.10 | 0.01 | 0.004 | 0.02 | 0.001 | 0 | 99.99 | 84.8 | 578 | 5.3 |
| 309 | « | 77.40 | 0.01 | 12.30 | 0 | 0.61 | 0.01 | 0.11 | 0.76 | 2.0 | 5.2 | 0.03 | - | 0.10 | 0 | 0.005 | 0.02 | 0.001 | 0 | 99.46 | 84.7 | 426 | - |
| 316 | « | 77.00 | 0.01 | 12.90 | 0 | 1.16 | 0.01 | 0.09 | 0.51 | 2.80 | 6.03 | 0.01 | - | 0.14 | 0.01 | 0.002 | 0.025 | 0.01 | 0 | 100.71 | 69.4 | 413 | - |
| Burgali massif | | | | | | | | | | | | | | | | | | | | | | | |
| 251* | granite | 68.15 | 0.68 | 15.22 | 1.08 | 3.34 | 0.04 | 1.56 | 1.60 | 2.89 | 3.84 | 0.21 | - | 0.96 | 0.11 | - | 0.014 | 0 | 0 | 99.69 | 73.4 | 1002 | 8.6 |
| 255* | « | 68.69 | 0.69 | 15.12 | 0.85 | 3.79 | 0.05 | 1.24 | 1.52 | 3.25 | 3.84 | 0.19 | - | 0.51 | 0.12 | - | 0.012 | 0 | 0 | 99.87 | 74.5 | 1003 | 8.4 |
| 369 | « | 70.00 | 0.57 | 14.40 | 0.08 | 3.38 | 0.06 | 0.98 | 1.28 | 2.99 | 4.25 | 0.22 | 0.14 | 0.66 | 0.08 | 0.02 | 0.02 | 0.002 | 0.03 | 99.02 | 77.8 | 995 | 7.2 |
| 603/2 | « | 71.26 | 0.37 | 14.97 | 1.60 | 0.52 | 0.11 | 0.43 | 0.95 | 3.12 | 5.34 | 0.35 | - | 0.97 | 0.06 | 0.012 | 0.015 | 0 | 0.06 | 100.11 | 82.0 | 960 | 7.7 |
| 254* | « | 71.51 | 0.32 | 14.45 | 0.88 | 2.02 | 0.05 | 0.51 | 0.70 | 3.37 | 4.70 | 0.21 | - | 0.94 | 0.10 | - | 0.0091 | 0 | 0 | 99.77 | 84.6 | 950 | 6.9 |
| 256* | « | 72.84 | 0.28 | 14.32 | 1.04 | 1.21 | 0.01 | 0.20 | 0.65 | 3.76 | 5.09 | 0.13 | - | 0.38 | 0.07 | - | 0.0146 | 0.005 | 0 | 100.00 | 91.4 | 937 | 6.5 |
| 2150/1 | « | 73.08 | 0.37 | 13.78 | 0.24 | 2.23 | 0.04 | 0.57 | 0.93 | 3.24 | 4.70 | 0.18 | 0.20 | 0.66 | 0.08 | 0.0175 | 0.02 | 0 | 0.04 | 100.18 | 81.1 | 967 | 5.5 |
| 347 | « | 73.60 | 0.23 | 13.25 | 0.08 | 2.15 | 0.05 | 0.50 | 0.78 | 2.95 | 4.90 | 0.17 | 0.12 | 0.52 | 0.06 | 0.02 | 0.03 | 0.01 | 0.10 | 99.40 | 81.6 | 923 | 4.7 |
| 254/1* | « | 74.70 | 0.19 | 13.76 | 0.88 | 1.27 | 0.01 | 0.27 | 0.65 | 2.87 | 4.87 | 0.15 | - | 0.35 | 0.06 | - | 0.017 | 0.001 | 0 | 100.05 | 88.4 | 894 | 4.8 |
| 253/1* | « | 75.03 | 0.16 | 12.89 | 0.71 | 1.43 | 0.01 | 0.02 | 0.23 | 2.79 | 5.75 | 0.11 | - | 0.38 | 0.04 | - | 0.03 | 0.0005 | 0 | 100.17 | 97.6 | 878 | 3.8 |
| 2008/3 | « | 71.21 | 0.37 | 14.20 | 1.88 | 1.49 | 0.11 | 0.71 | 1.45 | 3.14 | 4.33 | 0.18 | 0.07 | 0.76 | 0.08 | 0.016 | 0.016 | 0 | 0.01 | 99.91 | 81.7 | 964 | 6.5 |
| Leucogranite, aplite | | | | | | | | | | | | | | | | | | | | | | | |
| 365 | leucogranite | 70.30 | 0.02 | 16.20 | 0.09 | 0.86 | 0.02 | 0.01 | 0.33 | 5.80 | 4.65 | 0.36 | 0.12 | 0.42 | 0.05 | 0.0088 | 0.045 | 0.004 | 0 | 99.29 | 98.9 | 345 | 9.9 |
| 364 | « | 75.80 | 0.02 | 12.85 | 0.06 | 1.22 | 0.06 | 0.07 | 0.30 | 3.35 | 4.89 | 0.21 | 0.05 | 0.45 | 0.03 | 0.01 | 0.03 | 0.003 | 0 | 99.35 | 94.7 | 598 | 3.5 |
| 252* | « | 74.69 | 0.03 | 14.22 | 0.75 | 0.54 | 0.001 | 0.05 | 0.12 | 4.22 | 4.19 | 0.25 | | 0.53 | 0.05 | | 0.018 | 0.001 | 0 | 99.66 | 96.0 | 676 | 5.4 |
| 253/2* | aplite | 74.87 | 0.03 | 14.04 | 0.37 | 0.68 | 0.01 | 0.05 | 0.14 | 4.25 | 4.06 | 0.28 | | 0.61 | 0.05 | | 0.018 | 0.001 | 0 | 99.46 | 95.2 | 482 | 5.1 |
| Microcline-albite granite of the Verkhne-Burgali ethmoliht | | | | | | | | | | | | | | | | | | | | | | | |
| 267* | granite | 69.31 | 0 | 17.98 | 0.06 | 1.28 | 0.02 | 0.005 | 0 | 4.12 | 3.50 | 2.29 | | 1.05 | 1.27 | 0.46 | 0.13 | 0.004 | 0 | 101.48 | 99.6 | 333 | 11.3 |

| Microcline-albite granite of the Verkhne-Burgali ethmolith | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | Rock | $SiO_2$ | $TiO_2$ | $Al_2O_3$ | $Fe_2O_3$ | FeO | MnO | MgO | CaO | $Na_2O$ | $K_2O$ | $P_2O_5$ | $H_2O^-$ | $H_2O^+$ | F | $Li_2O$ | $Rb_2O$ | $Cs_2O$ | S | Total | f% | T°C | P, kb |
| 176 | microcline-albite granite | 69.90 | 0 | 16.20 | 0.08 | 0.72 | 0.05 | 0.02 | 0.05 | 5.02 | 3.92 | 1.30 | - | 0.76 | 1.14 | 0.46 | 0.19 | 0.007 | 0.05 | 99.87 | 97.5 | 357 | 9.6 |
| 223* | « | 70.37 | 0 | 17.79 | 0 | 0.74 | 0.04 | 0.005 | 0.03 | 5.16 | 2.64 | 2.04 | - | 1.00 | 1.04 | 0.80 | 0.17 | 0.009 | 0 | 101.83 | 99.3 | 335 | 10.5 |
| 220 | « | 70.82 | 0 | 16.65 | 0 | 0.71 | 0.02 | 0.005 | 0 | 4.41 | 3.86 | 1.68 | - | 1.07 | 1.08 | 0.59 | 0.11 | 0.004 | 0 | 101.01 | 99.3 | 351 | 9.5 |
| 235/1* | « | 70.84 | 0 | 17.83 | 0 | 0.71 | 0.04 | 0.005 | 0 | 5.66 | 2.05 | 2.25 | - | 0.49 | 0.90 | 0.76 | 0.15 | 0.009 | 0 | 101.69 | 99.3 | 335 | 10.4 |
| 203* | « | 71.43 | 0.002 | 16.76 | 0.58 | 0.99 | 0.05 | 0.005 | 0 | 4.70 | 3.57 | 1.11 | - | 0.70 | 1.40 | 0.26 | 0.11 | 0.003 | 0 | 101.67 | 99.6 | 94 | 9.3 |
| 230 | « | 71.50 | 0 | 15.80 | 0.04 | 1.04 | 0.07 | 0.04 | 0.09 | 4.36 | 3.70 | 0.92 | - | 0.84 | 1.34 | 0.32 | 0.14 | 0.009 | 0 | 100.21 | 96.4 | 363 | 8.2 |
| 204* | « | 71.77 | 0 | 16.58 | 0.32 | 1.14 | 0.08 | 0.005 | 0 | 4.64 | 3.59 | 1.02 | - | 0.71 | 1.20 | 0.24 | 0.12 | 0.004 | 0 | 101.42 | 99.6 | 352 | 9 |
| 221* | « | 72.01 | 0 | 16.23 | 0.50 | 0.55 | 0.02 | 0.005 | 0 | 4.13 | 3.35 | 1.68 | - | 0.91 | 1.08 | 0.42 | 0.10 | 0.0024 | 0 | 100.99 | 99.5 | 357 | 8.3 |
| 344 | « | 73.16 | 0.04 | 15.19 | 0 | 0.66 | 0.08 | 0 | 0.63 | 3.44 | 4.62 | 0.50 | - | 0.94 | 1.14 | 0.10 | 0.14 | 0.003 | 0.05 | 100.69 | 100 | 730 | 7 |
| 241/2* | « | 73.46 | 0 | 14.00 | 0 | 0.69 | 0.01 | 0.005 | 1.54 | 1.90 | 5.29 | 1.24 | - | 1.23 | 0.62 | 0.15 | 0.07 | 0.39 | 0 | 100.60 | 99.2 | 393 | 5.5 |
| 195 | « | 73.60 | 0 | 12.37 | 0.04 | 1.11 | 0.08 | 0.03 | 0.19 | 0.08 | 1.56 | 5.64 | - | 2.26 | 1.37 | 1.14 | 0.09 | 0.005 | 0.27 | 99.84 | 97.4 | - | - |
| Dykes of the Verkhne-Burgali ethmolith | | | | | | | | | | | | | | | | | | | | | | |
| 216/1* | microcline-albite granite | 65.28 | 0.02 | 20.58 | 0.12 | 2.65 | 0.16 | 0.005 | 0.04 | 3.04 | 5.38 | 1.4 | - | 0.94 | 1.09 | 1.29 | 0.35 | 0.007 | 0 | 101.41 | 99.8 | 472 | 10 |
| 216* | « | 67.55 | 0.01 | 20.60 | 0 | 2.41 | 0.15 | 0.005 | 0.01 | 3.43 | 3.48 | 1.22 | - | 0.83 | 0.90 | 1.03 | 0.25 | 0.005 | 0 | 101.88 | 99.7 | 302 | 7 |
| 229* | « | 69.21 | 0 | 17.02 | 0.38 | 1.42 | 0.03 | 0.005 | 0 | 5.65 | 2.94 | 2.30 | - | 0.86 | 1.10 | 0.45 | 0.10 | 0.003 | 0 | 101.47 | 99.7 | 346 | 8 |
| 228 | « | 69.86 | 0 | 17.62 | 0.43 | 0.28 | 0.03 | 0.005 | 0 | 4.08 | 3.44 | 2.40 | - | 1.34 | 1.40 | 0.53 | 0.0 | 0.004 | 0 | 101.41 | 99.2 | 337 | 7 |
| 179 | « | 71.80 | 0.01 | 12.82 | 1.29 | 0.83 | 0.18 | 0.03 | 0.77 | 4.05 | 1.99 | 1.19 | - | 1.56 | 2.68 | 0.81 | 0.22 | 0.013 | 0.10 | 100.34 | 98.5 | 415 | 4 |
| 286 | ongonite | 74.00 | 0.01 | 14.80 | 0.03 | 0.65 | 0.01 | 0.08 | 0.33 | 3.92 | 4.78 | 0.36 | - | 0.76 | 0.31 | 0.061 | 0.075 | 0.004 | 0 | 100.18 | 89.4 | 379 | 7 |
| 341 | pegmatite | 69.00 | 0 | 17.30 | 0.08 | 0.72 | 0.01 | 0.05 | 0.19 | 6.88 | 3.78 | 0.31 | 0.10 | 0.58 | 0.08 | 0.02 | 0.12 | 0.003 | 0.05 | 99.27 | 94.0 | 342 | 11.6 |
| 241/3* | « | 72.67 | 0.01 | 15.99 | 1.52 | 0.56 | 0.04 | 0.005 | 0.31 | 4.25 | 3.17 | 0.57 | | 0.88 | 0.70 | 0.19 | 0.06 | 0.004 | 0 | 100.93 | 99.7 | 360 | 7.7 |

*Notes*: The analyzes were performed at DPMGI SB RAS – analysts of D. A. Kulagina, G. N. Okhlopkova, S. E. Diakonova. $H_2O^-$ not included in the amount. Melt temperature by [1], P, kb by [2, 3]. * – analyses from [4].


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