**PRELIMINARY - U.S. Geological Survey Certificate of Analysis**

**Granodiorite, Silver Plume,Colorado, GSP-2**

Material used in the preparation of GSP-2 was collected by the U.S. Geological Survey, from the Silver Plume Quarry, which is located approximately 800 meters west of Silver Plume, Colorado. This is same location used to provide material for GSP-1. GSP-2 is a medium grained hypidiomophic- granular rock consisting essentially of quartz, plagioclase, microcline, biotite, and muscovite. Details of the collection, preparation, and testing are available (Wilson, S.A., 1998).

Element concentrations were determined in a round robin study involving 20 international laboratories. Recommended values are listed when analytical results provided by three independent laboratories using a minimum of three independent analytical procedures are in statistical agreement. Information values with standard deviations are listed when at least four independent laboratories using two independent analytical procedures have provided information. Information values without standard deviations represent information from a single laboratory or analytical procedure.

**Recommended Values**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Wt %** | **±** |  | **Oxide** | **Wt %** | **±** |
| Al | 7.88 | 0.11 | Al2O3 | 14.9 | 0.2 |
| Ca | 1.50 | 0.04 | CaO | 2.10 | 0.06 |
| Fetot | 3.43 | 0.11 | Fe2O3 tot | 4.90 | 0.16 |
| K | 4.48 | 0.12 | K2O | 5.38 | 0.14 |
| Mg | 0.58 | 0.02 | MgO | 0.96 | 0.03 |
| Na | 2.06 | 0.07 | Na2O | 2.78 | 0.09 |
| P | 0.13 | 0.01 | P2O5 | 0.29 | 0.02 |
| Si | 31.1 | 0.4 | SiO2 | 66.6 | 0.8 |
| Ti | 0.40 | 0.01 | TiO2 | 0.66 | 0.02 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **µg/g** | **±** |  | **Element** | **µg/g** | **±** |
| Ba | 1340 | 44 | Pb | 42 | 3 |
| Ce | 410 | 30 | Rb | 245 | 7 |
| Co | 7.3 | 0.8 | Sc | 6.3 | 0.7 |
| Cr | 20 | 6 | Sm | 27 | 1 |
| Cu | 43 | 4 | Sr | 240 | 10 |
| Eu | 2.3 | 0.1 | Th | 105 | 8 |
| Ga | 22 | 2 | U | 2.40 | 0.19 |
| La | 180 | 12 | V | 52 | 4 |
| Mn | 320 | 20 | Y | 28 | 2 |
| Nb | 27 | 2 | Yb | 1.6 | 0.2 |
| Nd | 200 | 12 | Zn | 120 | 10 |
| Ni | 17 | 2 | Zr | 550 | 30 |

**Information Values**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **µg/g** | **±** |  | **Element** | **µg/g** | **±** |
| Be | 1.5 | 0.2 | Ho | 1.0 | 0.1 |
| Cs | 1.2 | 0.1 | Li | 36 | 1 |
| Dy | 6.1 |  | Lu | 0.23 | 0.03 |
| Er | 2.2 |  | Mo | 2.1 | 0.6 |
| F | 3000 |  | Pr | 51 | 5 |
| Gd | 12 | 2 | Ti | 1.1 |  |
| Hf | 14 | 1 | Tm | 0.29 | 0.02 |

**Certificate Information**

Denver, Colorado  
November 1998

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**Bibliography**

*Wilson, S.A., 1998, Data compilation for USGS reference material GSP-2, Granodiorite, Silver Plume, Colorado: U.S. Geological Survey Open-File Report (in progress).*