## Muons in yttrium silicon oxide ($Y_2SiO_5$)

| $\langle Z/A \rangle$ | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|
| 0.46171 | 4.540 | 258.1 | 0.16963 | 3.0000 | 0.2000 | 3.0000 | 4.6447 | 0.00 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 5.566 | | | | 5.566 | $1.007 \times 10^0$ |
| 14.0 MeV | $5.616 \times 10^1$ | 4.372 | | | | 4.372 | $1.826 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 3.438 | | | | 3.438 | $3.391 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 2.686 | | | | 2.686 | $6.727 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.304 | | | | 2.304 | $1.077 \times 10^1$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.748 | | | | 1.748 | $3.132 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.648 | | | | 1.649 | $4.313 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.547 | | | | 1.548 | $6.829 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.494 | | | | 1.495 | $1.079 \times 10^2$ |
| 270. MeV | $3.602 \times 10^2$ | 1.482 | | | 0.000 | 1.483 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.484 | | | 0.000 | 1.484 | $1.752 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.498 | 0.000 | | 0.000 | 1.499 | $2.423 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.579 | 0.000 | | 0.000 | 1.580 | $5.021 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.613 | 0.001 | | 0.000 | 1.614 | $6.273 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.667 | 0.001 | 0.000 | 0.001 | 1.669 | $8.708 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 1.725 | 0.002 | 0.001 | 0.001 | 1.728 | $1.224 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 1.791 | 0.003 | 0.002 | 0.001 | 1.797 | $1.790 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 1.836 | 0.004 | 0.003 | 0.002 | 1.846 | $2.339 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 1.939 | 0.011 | 0.010 | 0.003 | 1.963 | $4.433 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 1.969 | 0.014 | 0.015 | 0.004 | 2.003 | $5.441 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 2.014 | 0.021 | 0.024 | 0.006 | 2.065 | $7.407 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 2.058 | 0.033 | 0.038 | 0.008 | 2.138 | $1.026 \times 10^4$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.104 | 0.054 | 0.067 | 0.012 | 2.238 | $1.483 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.136 | 0.077 | 0.098 | 0.016 | 2.327 | $1.921 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.206 | 0.173 | 0.235 | 0.031 | 2.646 | $3.530 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.228 | 0.224 | 0.309 | 0.039 | 2.800 | $4.265 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.260 | 0.329 | 0.461 | 0.054 | 3.105 | $5.621 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.294 | 0.494 | 0.702 | 0.076 | 3.567 | $7.423 \times 10^4$ |
| 300. GeV | $3.001 \times 10^5$ | 2.332 | 0.775 | 1.107 | 0.115 | 4.330 | $9.964 \times 10^4$ |
| 347. GeV | $3.470 \times 10^5$ | 2.346 | 0.911 | 1.303 | 0.133 | 4.693 | *Muon critical energy* |
| 400. GeV | $4.001 \times 10^5$ | 2.360 | 1.067 | 1.527 | 0.153 | 5.107 | $1.209 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 2.426 | 2.271 | 3.253 | 0.309 | 8.259 | $1.819 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 2.447 | 2.890 | 4.137 | 0.388 | 9.864 | $2.040 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 2.480 | 4.134 | 5.901 | 0.550 | 13.066 | $2.392 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 2.515 | 6.037 | 8.595 | 0.796 | 17.944 | $2.782 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 2.555 | 9.217 | 13.073 | 1.219 | 26.065 | $3.242 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 2.585 | 12.442 | 17.601 | 1.648 | 34.277 | $3.576 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 2.656 | 25.458 | 35.812 | 3.430 | 67.357 | $4.393 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 2.680 | 32.021 | 44.969 | 4.347 | 84.018 | $4.658 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 2.716 | 45.114 | 63.237 | 6.231 | 117.298 | $5.059 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 2.754 | 64.880 | 90.762 | 9.121 | 167.518 | $5.485 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 2.799 | 97.784 | 136.561 | 14.123 | 251.268 | $5.969 \times 10^5$ |
| 40.0 TeV | $4.000 \times 10^7$ | 2.831 | 130.818 | 182.477 | 19.248 | 335.375 | $6.313 \times 10^5$ |
| 80.0 TeV | $8.000 \times 10^7$ | 2.911 | 263.188 | 366.280 | 40.689 | 673.069 | $7.138 \times 10^5$ |
| 100. TeV | $1.000 \times 10^8$ | 2.937 | 329.502 | 458.272 | 51.778 | 842.491 | $7.403 \times 10^5$ |