# Addendum to "Absorbed dose fraction for $^{87}$Rb β particles"

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This recent paper (Readhead, 2002) calculated the absorbed dose fraction for β particles emitted by $^{87}$Rb sources uniformly distributed in a spherical grain of quartz, when surrounded by a region not containing any $^{87}$Rb sources. The converse situation, of $^{87}$Rb-free quartz grains embedded in an medium uniformly emitting $^{87}$Rb β particles, was considered by Adamiec and Aitken (1998). Thinking that an "approximate evaluation of this factor is not available", they "arbitrarily" took the attenuation factor for coarse-grain dating to be 0.75 (see the footnote to Table 8).

The two absorber-emitter situations are complimentary, and a more accurate attenuation factor for the latter case can be obtained from Readhead (2002) by simply replacing Equation 1 with $D_e = N_0 E_0 (1 - S_e)$. Table 1 can then be used to obtain the attenuation factor. For example, for 100 μm diameter grains the attenuation factor is $0.512\,(=1-0.488)$, leading to an absorbed dose of $0.0825 \times 0.512$ MeV/$N_0$ or $0.3580 \times 0.512$ μGy/a/(ppm Rb). Note that the attenuation factor differs substantially from the value used by Adamiec and Aitken (1998), although in most dating situations this difference will only have a minor affect on the age of the sample.

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**References**

Adamiec, G. and Aitken, M. (1998). Dose-rate conversion factors: update. *Ancient TL* **16**, 37-50.

Readhead, M.L. (2002). Absorbed dose fraction for $^{87}$Rb β particles. *Ancient TL* **20**, 25-28.