DECOMP: A USER-FRIENDLY FORWARD MODELING PROGRAM FOR (U-TH)/HE LOW-TEMPERATURE GEOCHRONOLOGY

T. J. Dunai, A. Bikker, A. G. C. A. Meesters

Faculty of Earth and Life Sciences, Vrije Universiteit, Amsterdam (tibor.dunai@falw.vu.nl / Fax: +31-20-6462457)

Recently a general solution for production-diffusion equations for various shapes has been published that incorporates the effects of alpha particle emission and a non-homogenous distribution of parent nuclides (Meesters and Dunai, 2002). Here we present a user-friendly software, DECOMP, that uses the equations and conclusions of this paper. DECOMP runs on Windows® platforms. The program allows to perform forward modelling of He production and diffusion for any user defined thermal history. Diffusion parameters, alpha-emission distance, zonation of parent nuclides and dimensions of the modelled crystal can be changed by the user in a simple, visually aided dialogue. The program uses equivalent spherical dimensions that can be used to describe more definite shapes without significant loss of accuracy, as tested and discussed in Meesters and Dunai (2002). The numeric values of thermal histories and corresponding calculated nominal age evolution curves can be exported to any standard spreadsheet program. While DECOMP has been written primarily for the use in (U-Th)/He thermo-chronology it can be applied to other thermochronometrically used decay schemes. This can be achieved via the free selection of the relevant parameters (Ea, D0, setting the emission distance to zero). In the presentation numeric examples will be discussed to illustrate how DECOMP can be applied to constrain possible thermal histories experienced by natural samples and how to use it for sensitivity testing of parameters.
