TLD-MC : ThermoLuminescence Deconvolution in MathCad

Last revised: 2013-06-01

Folder containing the data files: DataFolder := "data"

▶ General ———————————————————————————————————————

▶ Models ———————————————————————————————————————

▶ Temp ———————————————————————————————————————

===================== Experimental data =====================

$$\text{Load} := \begin{pmatrix} \text{FILE} & \text{"sample.dat"} \\ \text{BETA} & 8.4 \end{pmatrix}$$

▶ Processing
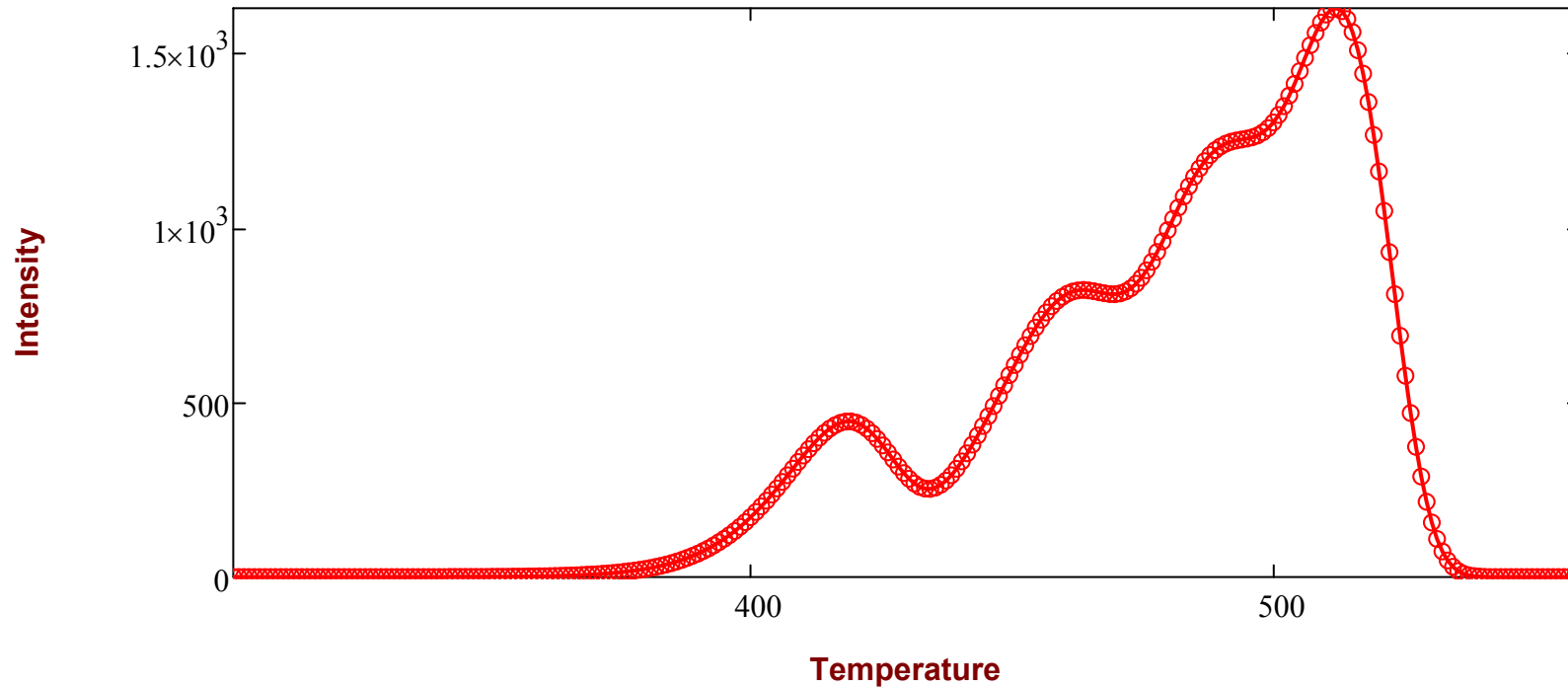
================= Model selection =================

$$\begin{pmatrix} \text{Model} \\ \text{Background} \end{pmatrix} := \begin{pmatrix} \text{FOK\_A1} \\ \text{ZERO} \end{pmatrix}$$

FOK	**Randall-Wilkins first-order kinetics (exact)**
FOK_A1	**First-order kinetics approximation by Kitis et al.**
FOK_A2	**First-order kinetics approximation by a quotient of polynomials**
FOK_A3	**First-order kinetics approximation by Podgorsak et al.**
FOK_W	**First-order kinetics approximation by Weibull distribution**
SOK	**Garlick-Gibson second-order kinetics (exact)**
SOK_A1	**Second-order kinetics approximation by Kitis et al.**
GOK	**May-Partridge general-order kinetics (exact)**
GOK_A1	**General-order kinetics approximation by Kitis et al.**
MOK	**Mixed-order kinetics (exact)**
GA	**General approximation (independent traps)**
CGA	**General approximation (coupled traps)**

Background functions:

ZERO	**Zero**	
CONSTANT	**A constant value (e.g. detector dark signal).**	
EXP	**Exponential**	$y(x) = B_1 + B_2 \cdot \exp(B_3 \cdot x)$
POLY	**Polynomial**	$y(x) = B_1 + B_2 \cdot x + B_3 \cdot x^2 + ...$

▶ Processing ─────────────────────────────────

▶ Archive ─────────────────────────────────

================= Parameter initialization =================

Each column of guess values contains ordered data for sngle trap
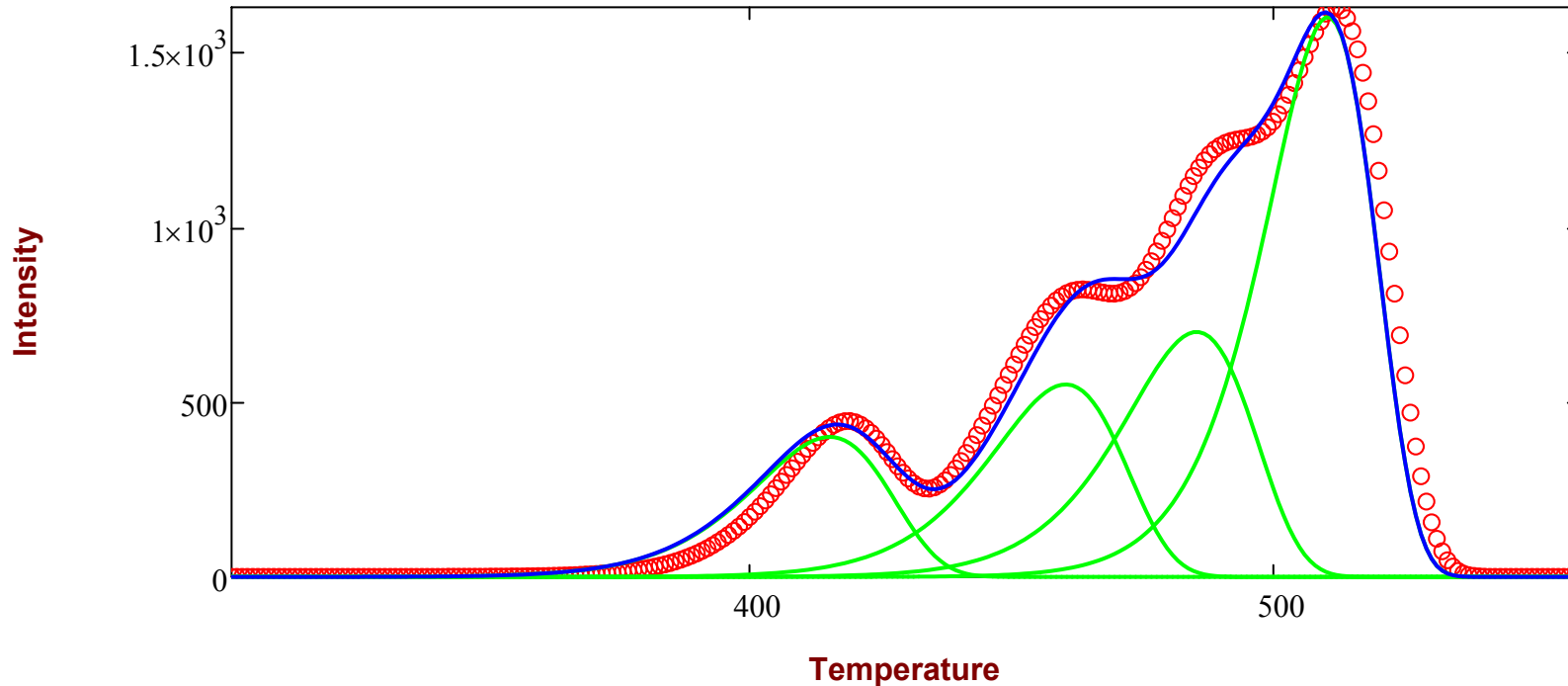
$$\text{GuessValues} := \begin{pmatrix} 1.1 & 1.4 & 1.6 & 2.1 \\ 415 & 460 & 485 & 510 \\ 400 & 550 & 700 & 1600 \end{pmatrix}$$

$$\text{Info} = \begin{pmatrix} \text{"E"} & \text{"Activation energy (eV)"} \\ \text{"Tm"} & \text{"Peak temperature (K)"} \\ \text{"Im"} & \text{"Peak intensity (a.u.)"} \end{pmatrix}$$

$$\text{BkgGuessValues} := 0$$

▶ Processing ───

$\text{FOM} = 10.0515 \cdot \%$

▶ Archive ───

▶ Processing ───

======================= Constraints =======================

▶ Processing ───

======================= Optimized result =======================

If necessary, copy-paste the parameter matrix as new input to repeat optimization

$$\text{OptimizedValues} = \begin{pmatrix} 1.382328 & 1.48185 & 1.581807 & 2.001031 \\ 417.185399 & 456.522684 & 484.011703 & 511.668348 \\ 398.154476 & 543.139247 & 835.592463 & 1623.056803 \end{pmatrix}$$
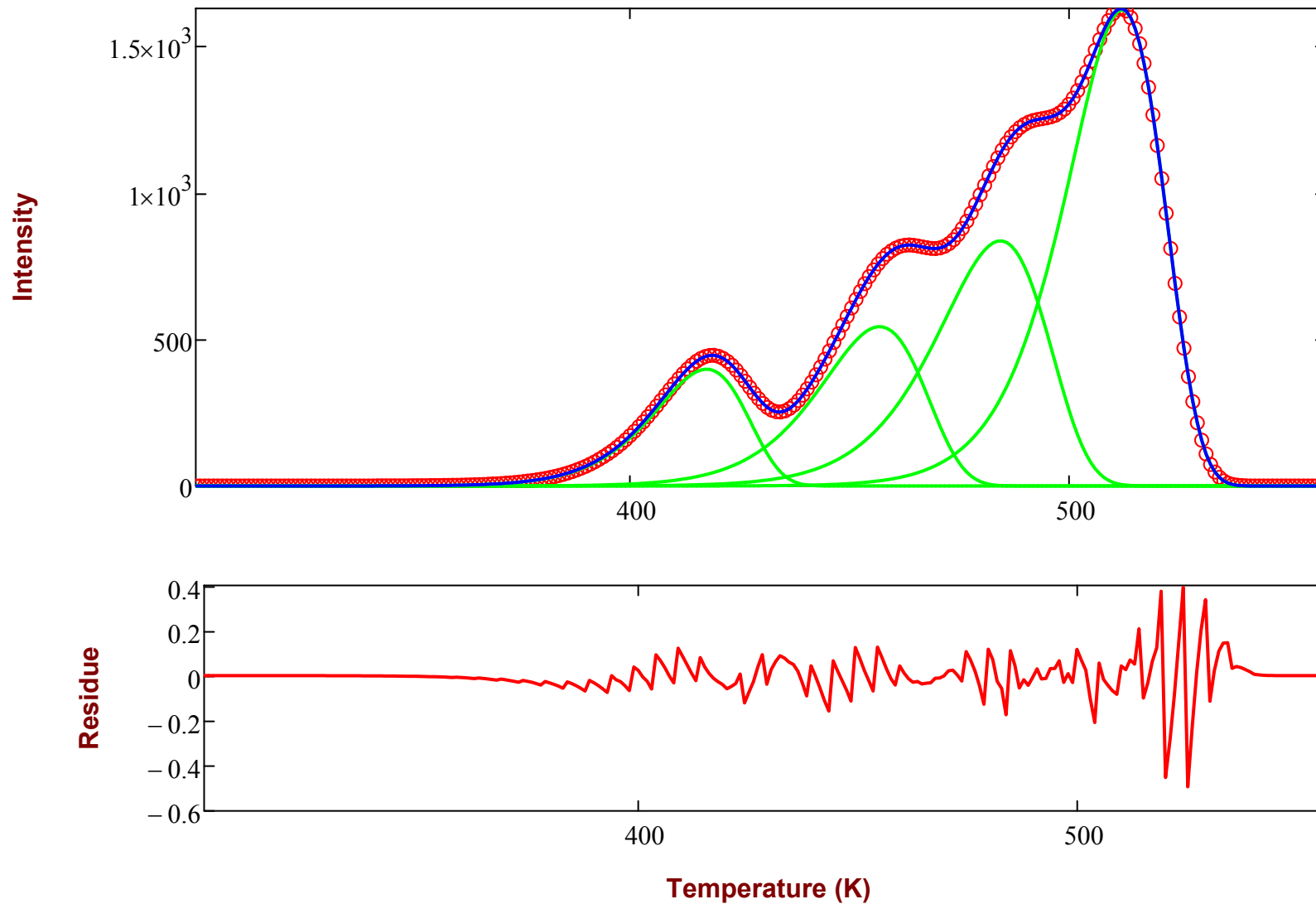
$$\text{OptimizedBkg} = 0$$

▶ Archive ───

▶ Processing ───

FOM = 0.01105·%

Full report was written to the file ReportFile = "data\sample.FOK_A1.report"
Glow curves were written to the file PeaksFile = "data\sample.FOK_A1.fit"

================================ End of Program ================================