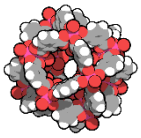


ICoFit.exe Documentation

"ICoFit" is the FurukawaG-original software to help you to fit ICF curves obtained by dynamic light scattering (DLS) measurement. You can simply drug&drop your measurement data on the software window to calculate fitting parameters.
Do not hesitate to ask me for bug-fix or new functions.

Release Log:

2019.09.15	ICoFit 1.0.0 (the first version was released.)
2019.09.16	ICoFit 1.1.0 (the power-law fitting was newly installed.)

What can we do?

You can fit your ICF curves using the equation showed below:

$$g^{(2)}(\tau) - 1 = \sigma_1^2 \left\{ Ae^{(-\tau/\tau_f)} + (1-A)e^{-(\tau/\tau_s)^\beta} \right\}^2 \quad \text{Eq.1}$$

$$g^{(2)}(\tau) - 1 = \sigma_1^2 \left\{ Ae^{(-\tau/\tau_f)} + (1-A)(1+\tau/\tau^*)^{\frac{n-1}{2}} \right\}^2 \quad \text{Eq.2}$$

Here, each parameter is corresponding to the reference.
In the recent version, parameters $\sigma_1^2, A, \tau_f, \tau_s, \beta$ or $\sigma_1^2, A, \tau_f, \tau^*, n$ are calculated by ordinary least square (OLS) method.

How to use?

To use ICoFit, several conditions are assumed:

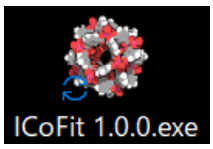
- The data file is exported from ***Zetasizer Nano ZS instrument*** *(Malvern Instruments).*
- The data file contains two columns named "**Correlation Data[i]**" and "**Correlation Delay Times[i] (μs)**" (i = 0-192). Other columns can be contained.
- The data is saved as **Excel** file (**.xlsx**).

If you are satisfying these rules, you can readily execute ICoFit as below.

1. Double click the icon of ICoFit to start.

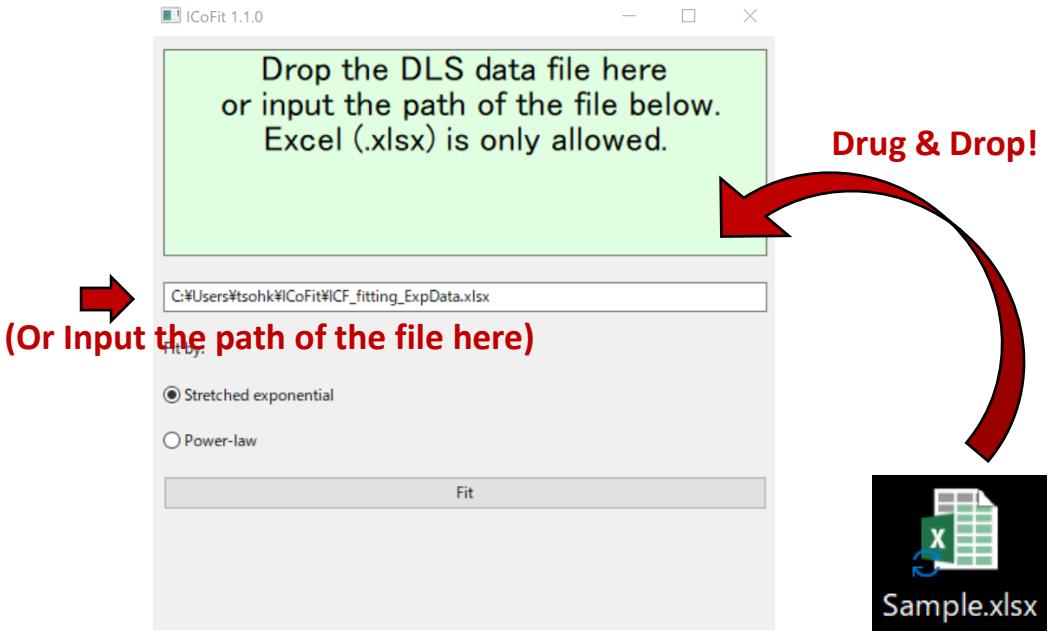
It will take about 30 s until the window opens.

Double Click this!



2. Drug&Drop the DLS data in the green panel.

Instead of doing drug&drop, you can input the path (e.g. C:¥Users¥MC2¥sample.xlsx) of the file in the box below the green panel.



3. Select the type of fitting and click “Fit” to start calculation.

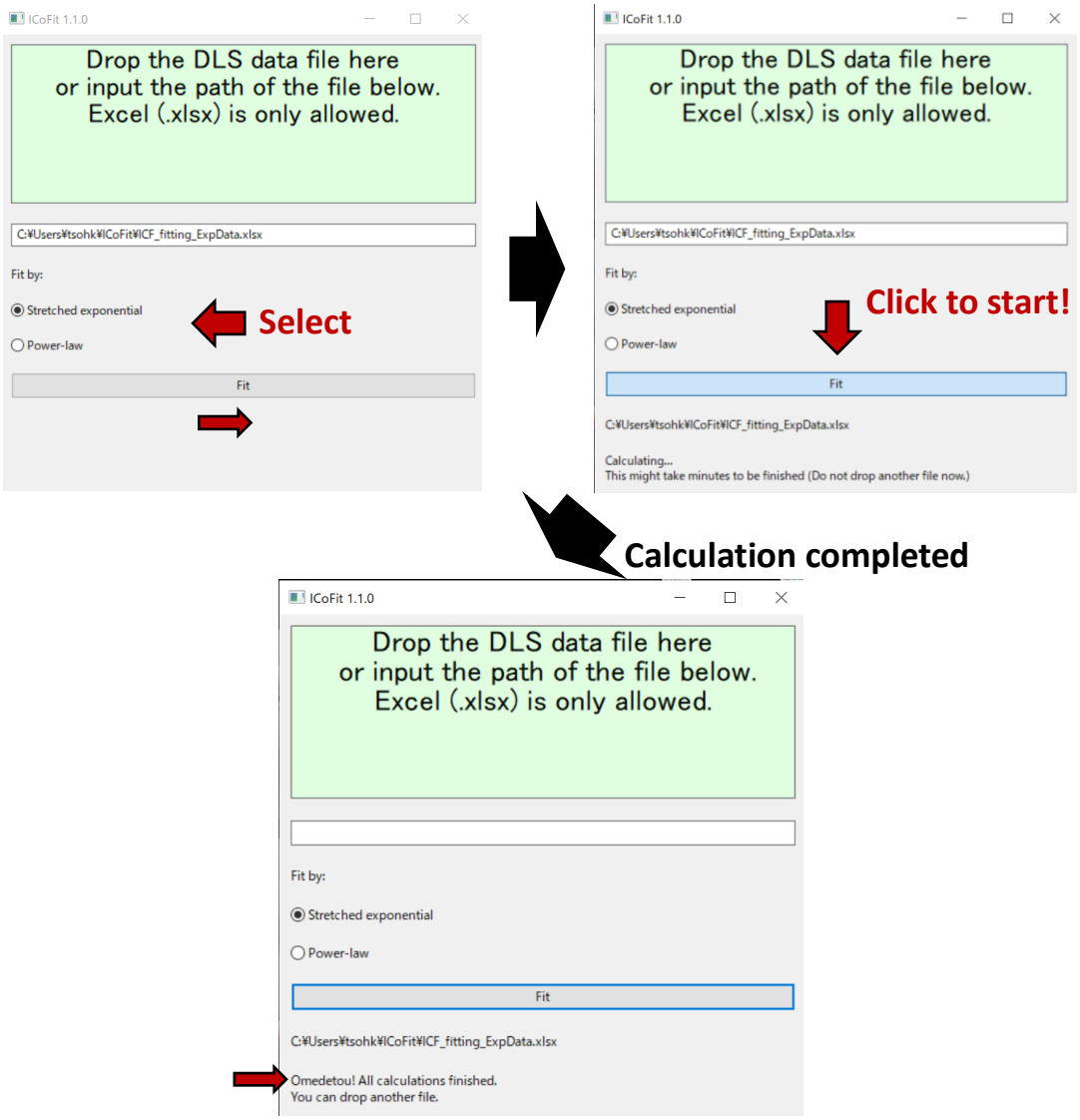
“Stretched exponential” uses Eq.1 and “Power-law” uses Eq.2.

It will take some time. For instance, it takes around 15 s to fit 100 data.

Completion of the calculation will be noticed by the message of “Omedetou!”(see the pictures below).

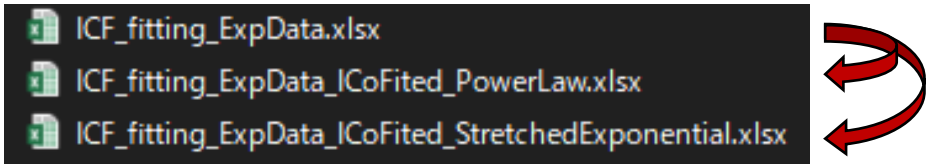
ATTENTION: Do NOT put a new excel file during calculation. It might interrupt the process under calculation.

After calculation completed, you can repeat with another file again. Click “X” when you close the window.



4. Calculated parameters are automatically exported as excel file in the same folder as the input file.

If the name of input file is “Sample.xlsx”, the exported file will be named as “Sample_ICoFited_StretchedExponential.xlsx” or “Sample_ICoFited_PowerLawl.xlsx” depending on the type of fitting you used.



In the stretched exponential fitting, the exported file has ten columns “sigma2”, “A”, “tauf”, “taus”, “beta”, “sd_sigma2”, “sd_A”, “sd_tauf”, “sd_taus”, and “sd_beta”.

	A	B	C	D	E	F	G	H	I	J
1	sigma2	A	tauf	taus	beta	sd_sigma2	sd_A	sd_tauf	sd_taus	sd_beta
2	0.916415	0.223082	8.14E-05	0.000349	0.904843	0.000773	0.008302	2.48E-06	4.47E-06	0.010009
3	0.363046	0.226017	6.07E-05	0.000312	0.904092	0.000359	0.008469	1.43E-06	4.32E-06	0.011953
4	0.916668	0.260906	8.65E-05	0.00038	0.91845	0.000725	0.008446	2.18E-06	5.19E-06	0.011108
5	0.365201	0.2432	6.86E-05	0.000331	0.879937	0.000425	0.009131	2.02E-06	5.23E-06	0.012394
6	0.645501	0.140618	5.82E-06	0.001343	0.759391	0.014442	0.012607	1.15E-06	5.69E-05	0.045019
7	0.884425	0.413934	0.000184	0.00067	0.735592	0.001107	0.015629	5.06E-06	2.07E-05	0.012691
8	0.87306	0.401399	0.000171	0.00064	0.755694	0.000957	0.013408	4.39E-06	1.66E-05	0.011165
9	0.874957	0.434047	0.000181	0.000675	0.733619	0.000967	0.013479	4.15E-06	1.91E-05	0.011529
10	0.862525	0.335622	0.00015	0.00057	0.80587	0.000847	0.011838	4.42E-06	1.14E-05	0.009938
11	0.863343	0.391172	0.000165	0.000618	0.77671	0.000855	0.012615	4.19E-06	1.45E-05	0.0105
12	0.872142	0.48889	0.000192	0.000753	0.702104	0.001036	0.013061	3.75E-06	2.53E-05	0.012718
13	0.865455	0.385113	0.000163	0.000581	0.791006	0.000913	0.015255	4.92E-06	1.51E-05	0.011841
14	0.861618	0.414281	0.00017	0.000616	0.772276	0.00091	0.014705	4.54E-06	1.69E-05	0.011946
15	0.858801	0.397645	0.000161	0.000601	0.797635	0.000802	0.012573	4.07E-06	1.39E-05	0.010754
16	0.86197	0.562416	0.000199	0.000891	0.672559	0.001037	0.011074	3.01E-06	3.56E-05	0.013739

Here, “sigma2”, “A”, “tauf”, “taus”, “beta” are corresponding to the parameters $\sigma_1^2, A, \tau_f, \tau_s, \beta$ and “sd_sigma2”, “sd_A”, “sd_tauf”, “sd_taus”, “sd_beta” are the standard deviations of each fitted parameter.

In the power-law fitting, the exported file has columns named “sigma2”, “A”, “tauf”, “taux”, “n”, “sd_sigma2”, “sd_A”, “sd_tauf”, “sd_taux”, and “n”, which are corresponding to $\sigma_1^2, A, \tau_f, \tau^*, \mathrm{n}$ and their standard deviations.

The rows of exported file and input file are corresponding, so you can readily copy the contents of the exported file to the input file.