

## S1. Parameter sets

### Model 1

Allowing all 8 kinetic parameters to vary, we obtained the parameter set  $P_{mean}$  by taking the mean of the parameter probability distributions from the MCMC chain. This parameter set and the maximum likelihood parameter set from [37] are given below.

Parameter	$P_{mean}$	$P_{opt}$
$k_{RL}$	$2.7945 \times 10^{-3}$	$2 \times 10^{-3}$
$k_{RLm}$	$7.3044 \times 10^{-3}$	$10^{-2}$
$k_{Rs}$	1.1228	4
$k_{Rd0}$	$9.0087 \times 10^{-5}$	$4 \times 10^{-4}$
$k_{Rd1}$	$2.4735 \times 10^{-3}$	$4 \times 10^{-3}$
$k_{G1}$	$9.0032 \times 10^{-1}$	1
$k_{Ga}$	$1.1471 \times 10^{-5}$	$10^{-5}$
$k_{Gd}$	$1.5609 \times 10^{-1}$	$1.1 \times 10^{-1}$

**Table A.** Mean parameter set from MCMC parameter estimation for Model 1.

### Model 2

After reducing the parameter count to 15 parameters, we are able to determine point estimates of the parameters by taking the mean of the probability distributions from MCMC. We also use simulated annealing to find an ‘optimal’ parameter set. Both of these parameter sets, as well as their corresponding model output polarization factors, are given below. The mean polarization factor of the data was 0.8733.

Parameter	MCMC mean	SA
$k_{24cm0}$	$3.0320055 \times 10^{-2}$	$4.5138694 \times 10^{-2}$
$k_{24cm1}$	$7.6652079 \times 10^{-3}$	$2.6129671 \times 10^{-3}$
$k_{24d}$	$9.8590235 \times 10^{-1}$	$6.9810380 \times 10^{-1}$
$k_{42a}$	$1.9826224 \times 10^{-4}$	$3.3996171 \times 10^{-5}$
$k_{42d}$	$1.1113222 \times 10^{-1}$	$2.3604239 \times 10^{-2}$
$k_{B1cm}$	$1.5080301 \times 10^{-4}$	$3.1423170 \times 10^{-5}$
$k_{B1mc}$	$6.3228081 \times 10^{-2}$	$6.5626614 \times 10^{-2}$
$k_{Cla4a}$	$5.5002477 \times 10^{-3}$	$1.2886983 \times 10^{-2}$
$k_{Cla4d}$	$1.2111474 \times 10^{-2}$	$1.1516911 \times 10^{-2}$
$C24_t$	$1.8312125 \times 10^3$	$1.1631549 \times 10^3$
$B1_t$	$3.2136500 \times 10^3$	$2.5837722 \times 10^3$
$q$	$5.6447425 \times 10^1$	$9.2959120 \times 10^1$
$h$	5.2838600	7.7413850
$D_{c42}$	$1.2569088 \times 10^{-2}$	$1.7240839 \times 10^{-2}$
$D_{c42a}$	$7.8515533 \times 10^{-3}$	$6.2231633 \times 10^{-3}$
Polarization factor	0.5722	0.6389

**Table B.** Parameter sets from MCMC parameter estimation and simulated annealing for Model 2.