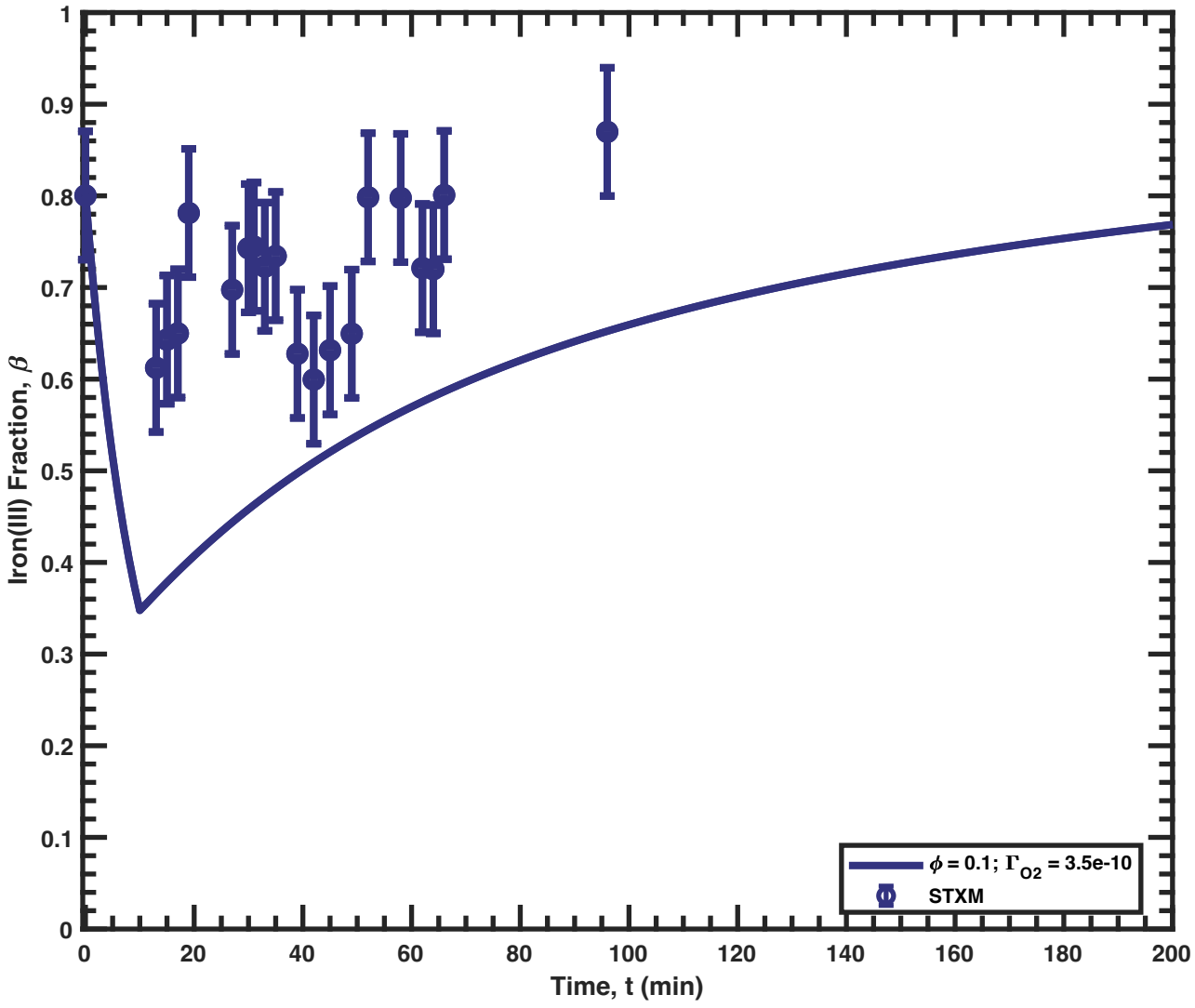
Iron(III) Fraction, β
Time, t (min)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
20
40
60
80
100
120
140
160
180
200
ϕ = 0.1; Γ O2 = 3.5e-10
STXM

G2 Calculation of reacto-diffusive length for O_2

We know from Hanson et al. (1994) that the reacto-diffusive length is defined as:

$$l_D = \sqrt{\frac{D_l}{k^I}}, \tag{G1}$$

whereas D_l is the liquid phase diffusion coefficient (taken from Dou et al. (2021)) and k^I describes the sum of the oxygen sinks corresponding to the turnover rate of reaction R2 in Table 3 ($3.9 \times 10^{-2}\,\mathrm{M\,s^{-1}}$) in our case divided by the O_2 concentration in steady state (C_{ss} in $moles$, taken from Figure F4). In this case, it is equivalent to:

$$k^I = \frac{k^{R2}}{C_{ss}}, \tag{G2}$$

This leads to a reacto-diffusive length, l_D, for oxygen of $2.66 \times 10^{-8}\,\mathrm{m}$.

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Competing interests. At least one of the (co-)authors is a member of the editorial board of Atmospheric Chemistry and Physics

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