Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information for:

Multistructural Microiteration Combined with QM/MM-ONIOM Electrostatic Embedding

Kimichi Suzuki*[a,b,c] and Satoshi Maeda*[a,b,c,d]

[a] *Institute for Chemical Reaction Design and Discovery* (WPI-ICReDD)*, Hokkaido University, Hokkaido 001-0021, Japan.*

[b] *Department of Chemistry, Faculty of Science, Hokkaido University, Sapporo 060-0810, Japan*

[c] *JST, ERATO Maeda Artificial Intelligence for Chemical Reaction Design and Discovery Project, Sapporo 060-0810, Japan*

[d] *Research and Services Division of Materials Data and Integrated System (MaDIS), National Institute for Materials Science (NIMS), Tsukuba 305-0044, Japan*

* To whom correspondence should be addressed.

Email: ki_suzuki@eis.hokudai.ac.jp or smaeda@eis.hokudai.ac.jp.

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Figure S1. Schematic illustration of the charge elimination and redistribution scheme. a) Original MM charge for the cofactor flavin hydroperoxide (FADHOOH) and b) Adjusted MM charge for FADHOOH. QM atoms are colored red.

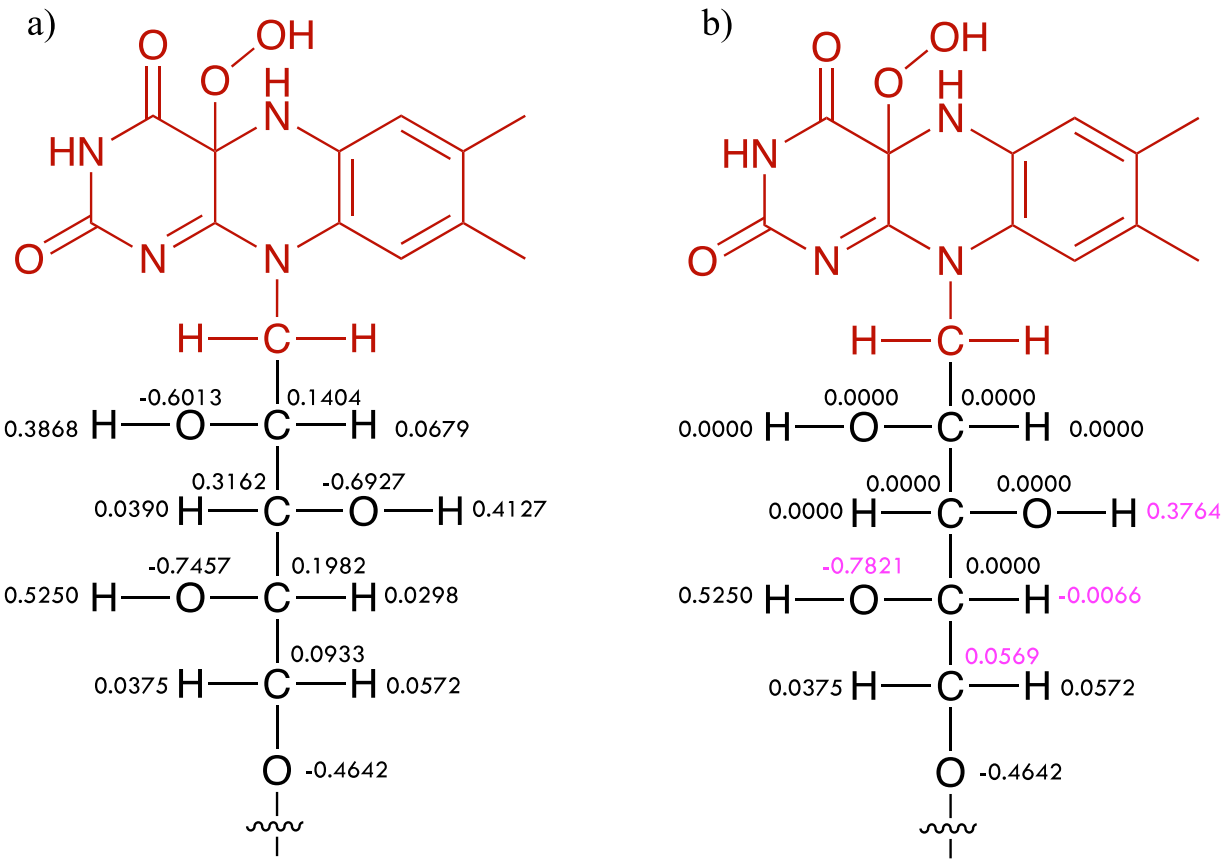


Figure S2. Relative energy and variations of $\omega^{(s)}$ b) by MSM-ME and c) by MSM-EE along LUP path of Claisen rearrangement in aqueous solutions.

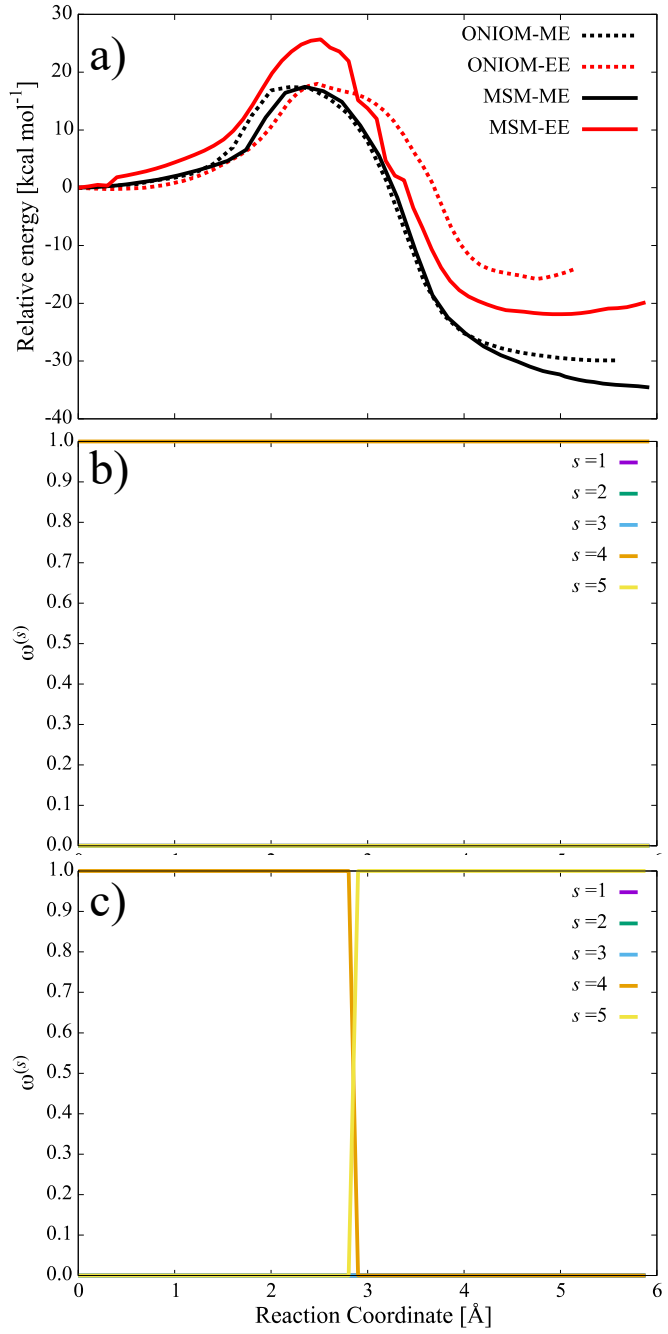
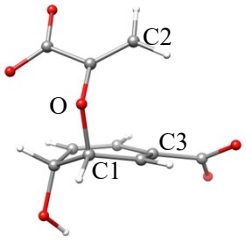


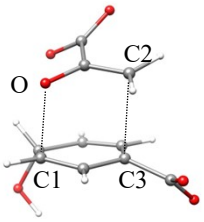
Figure S3. Optimized geometric parameters with respect to Claisen rearrangement reaction coordinate a) at the reactant, b) at the transition state, and c) product states in aqueous solutions.

a)



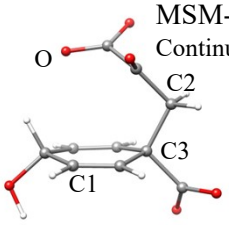
R_{OC1}	R_{C2C3}
1.469	3.545
1.486	3.381
1.472	3.532
1.476	3.447
1.469	3.597

b)



R_{OC1}	R_{C2C3}
2.185	2.905
2.113	2.732
2.133	2.758
2.221	2.583
2.162	2.646

c)



Bond length [Å]	
ONIOM-ME	R_{OC1}
ONIOM-EE	R_{C2C3}
MSM-ME	
MSM-EE	
Continuum Solvation Model	
4.099	1.578
3.332	1.583
4.154	1.572
3.435	1.571
3.801	1.571

Figure S4. Relative energy and variations of $\omega^{(s)}$ b) by MSM-ME and c) by MSM-EE along LUP path of Claisen rearrangement in enzyme.

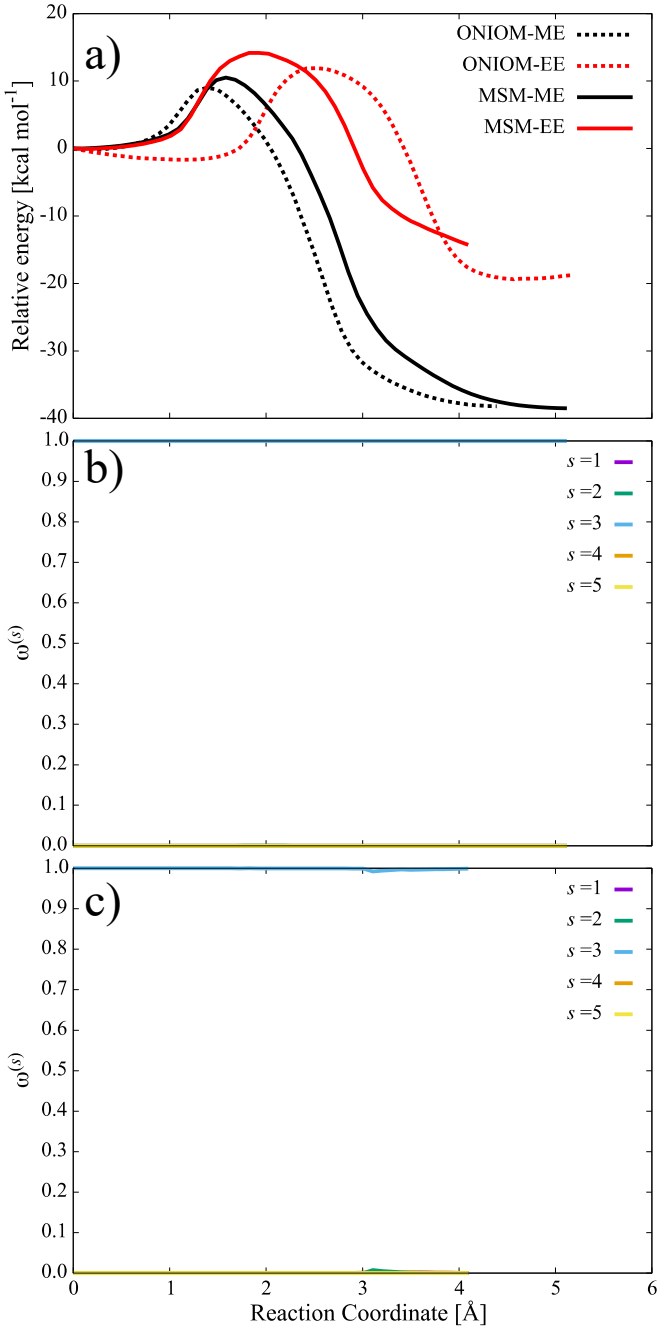
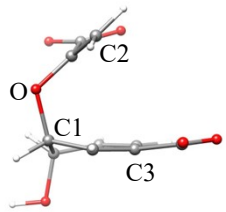


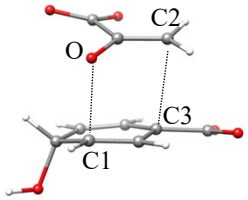
Figure S5. Optimized geometric parameters with respect to Claisen rearrangement reaction coordinate a) at the reactant, b) at the transition state, and c) product states enzyme.

a)



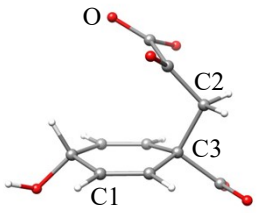
R_{OC1}	R_{C2C3}
1.487	3.409
1.490	3.496
1.483	3.399
1.492	3.431

b)



R_{OC1}	R_{C2C3}
1.980	2.765
2.234	2.765
1.999	2.755
2.253	2.678

c)



R_{OC1}	R_{C2C3}
4.111	1.584
3.789	1.589
4.117	1.582
3.507	1.594

Bond length [Å]
ONIOM-ME
ONIOM-EE
MSM-ME
MSM-EE

Figure S6. Relative energy and variations of $\omega^{(s)}$ b) by MSM-ME and c) by MSM-EE along AFIR path of hydroxylation in enzyme.

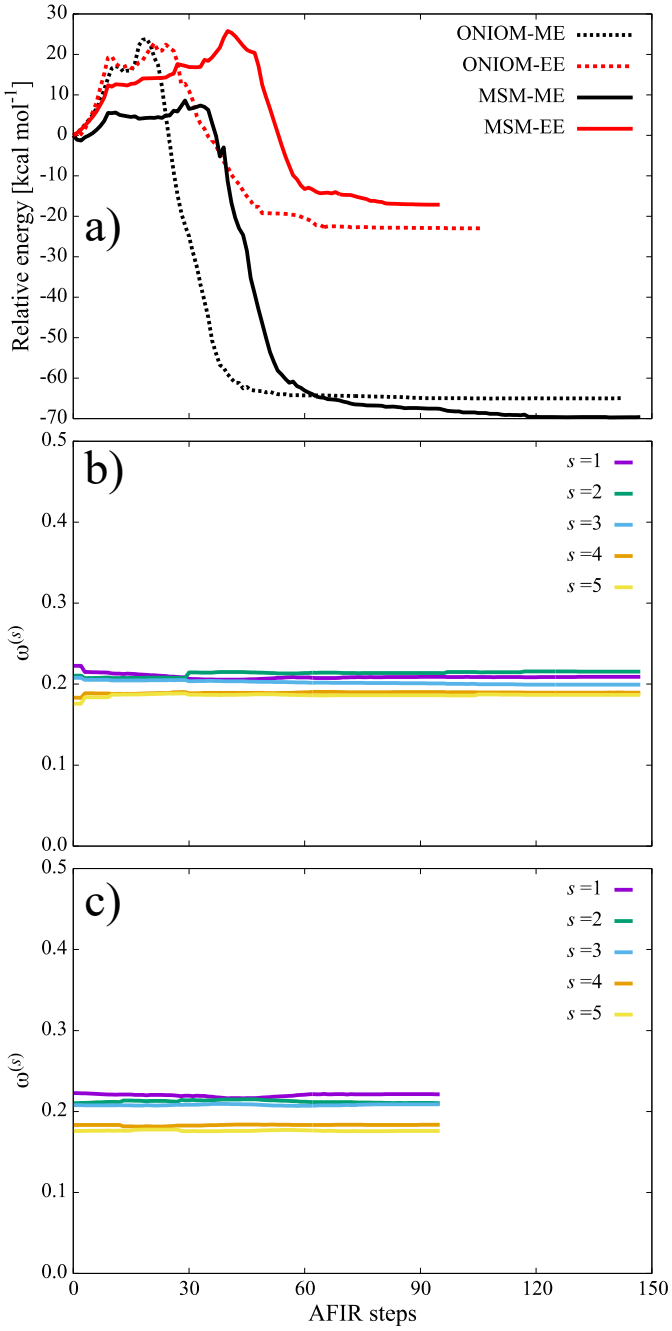


Figure S7. Relative energy and variations of $\omega^{(s)}$ b) by MSM-ME and c) by MSM-EE along LUP path of hydroxylation in enzyme.

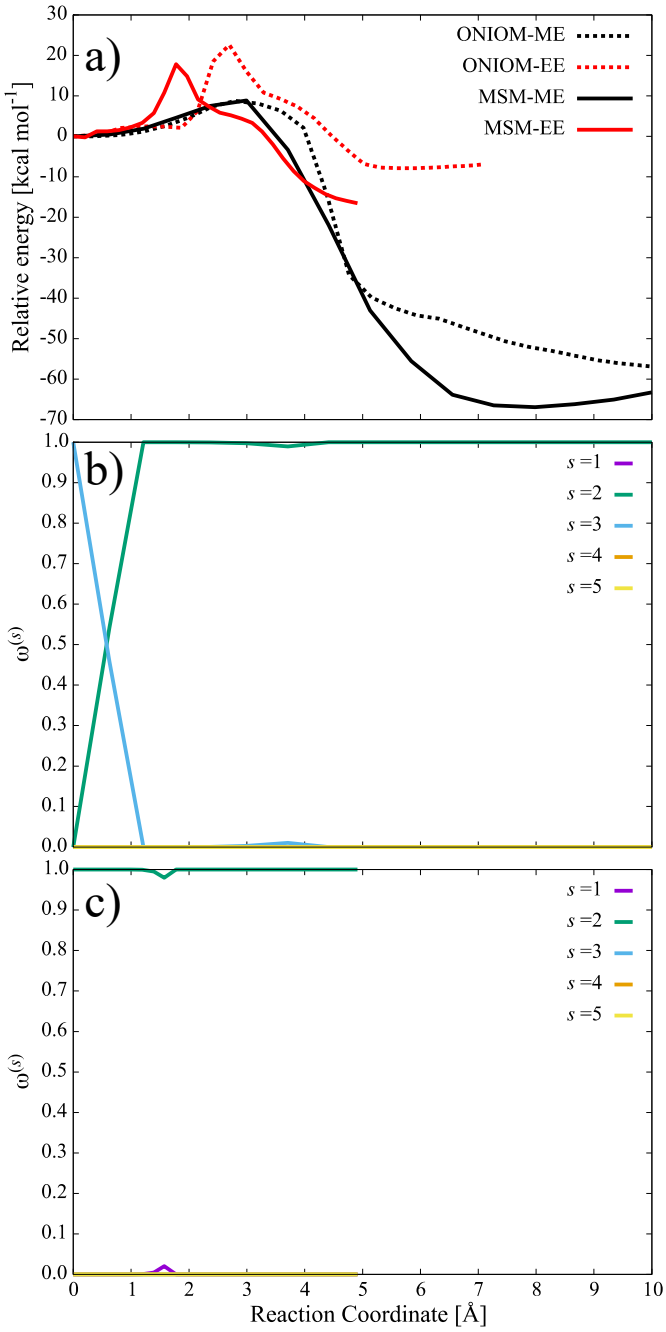
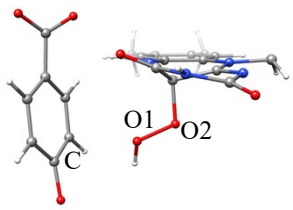


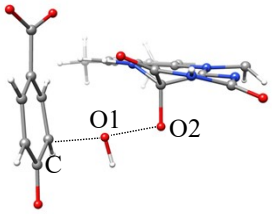
Figure S8. Optimized geometric parameters with respect to Claisen rearrangement reaction coordinate a) at the reactant, b) at the transition state, and c) product states enzyme.

a)



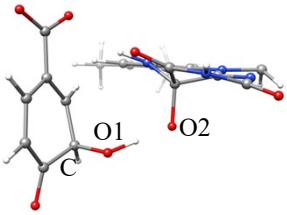
R_{O1O2}	R_{O1C}
1.436	3.052
1.469	2.598
1.420	2.953
1.459	2.879

b)



R_{O1O2}	R_{O1C}
1.473	2.661
1.913	1.912
1.449	2.584
1.893	1.926

c)



R_{O1O2}	R_{O1C}
2.566	1.432
2.438	1.400
2.381	1.428
2.428	1.411

Bond length [Å]
ONIOM-ME
ONIOM-EE
MSM-ME
MSM-EE