Document of supplementary material

1. Data sets for energy curves of different island types.

Used for plotting Fig. 1, Fig. 2.

List of files:

*P transition data.txt*

*H transition data.txt*

*D transition data.txt*

*mH transition data.txt*

*mD transition data.txt*

1. Data sets for chemical potential of different island types.

Used for generating Fig. 4 (a-d), Fig. 5(b), Fig. 7.

List of files:

*P\_mu transition data.txt*

*H\_mu transition data.txt*

*D\_mu transition data.txt*

*mH\_mu transition data.txt*

*mD\_mu transition data.txt*

1. Code for solving the Fokker-Planck reaction model using a flux limiter strategy and generating the evolution data of islands and chemical potential in Fig. 4(a-d), Fig. 5(a), Fig. 6, Fig. 7, Fig. 8 and Table 1.

List of files:

*growth-transition multiple island flux limiter.py*

1. Code for solving the DCP model using a flux limiter strategy and generating the evolution data of island and chemical potential for DCP curves in Fig. 7(a-b).

List of files:

*growth-transition single island flux limiter.py*

1. Data and Code for generating the reaction path data.

Find the saddle point as barrier state on the energy surface to generate the data of the barrier states. Then generate the lowest-barrier reaction path for transition between stable states in Fig. 3(a). The reaction path data can be used to calculate the reaction rates in the FPR system.

List of files:

*find saddle points by finer grids.py*

*asym\_dome.py*

*sym\_dome.py*

*generate reaction path.py*

*bH transition data.txt*

*bA transition data.txt*

*uD transition data.txt*