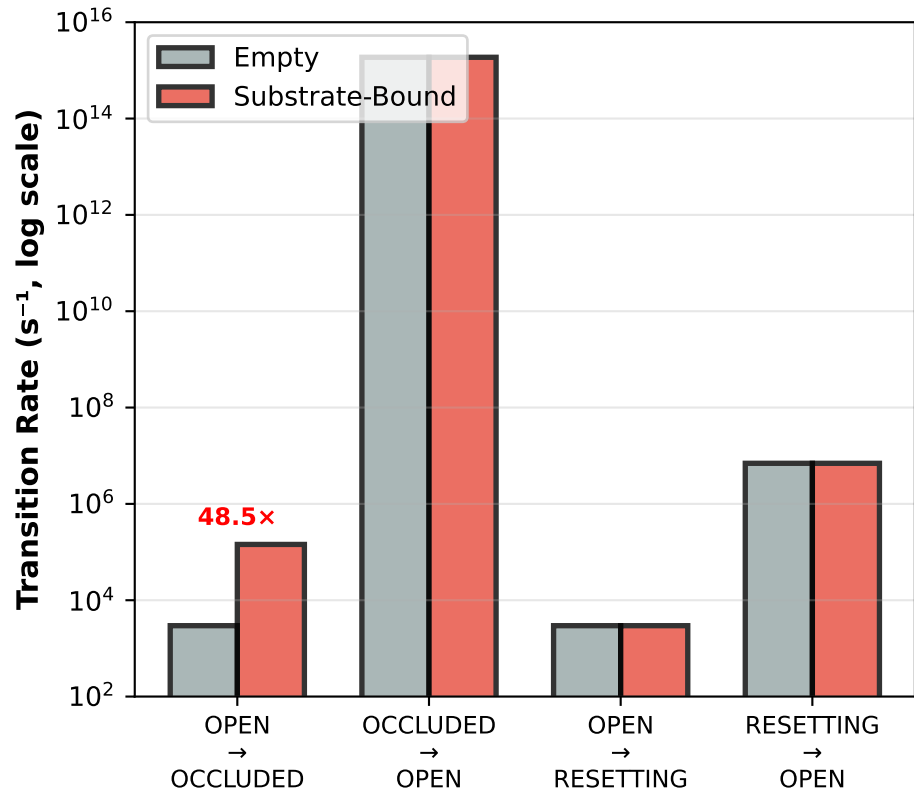
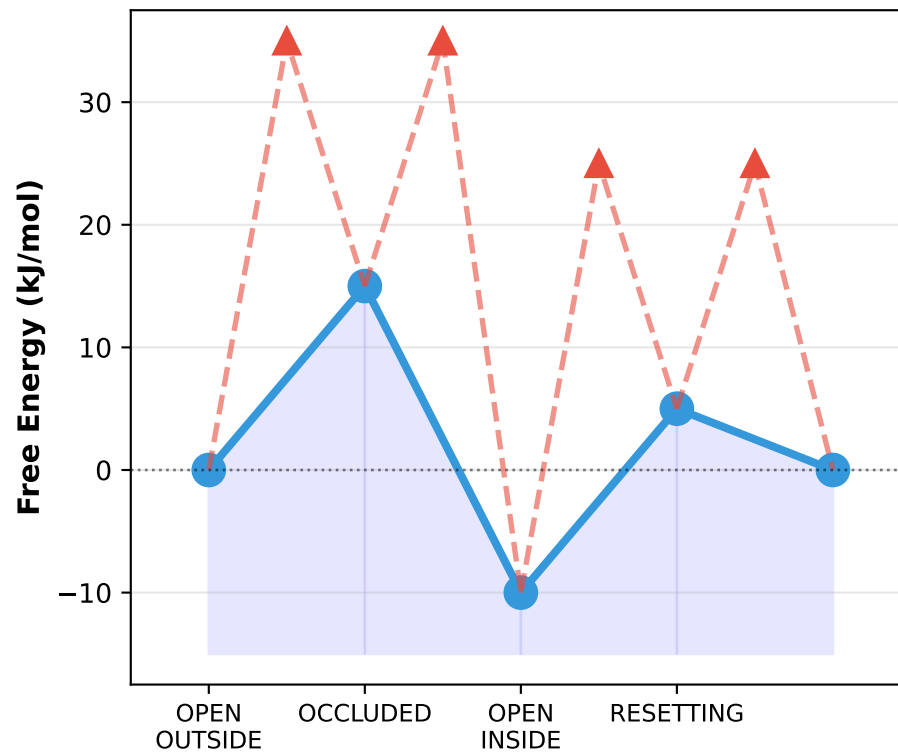


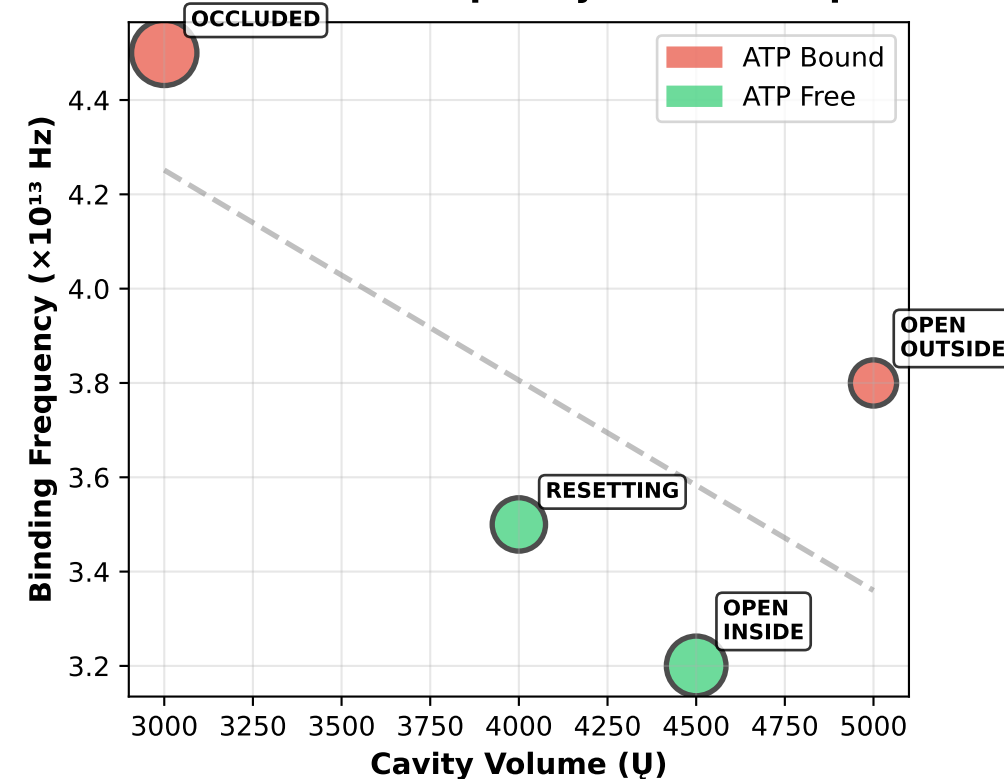
A. Transition Rate Enhancement



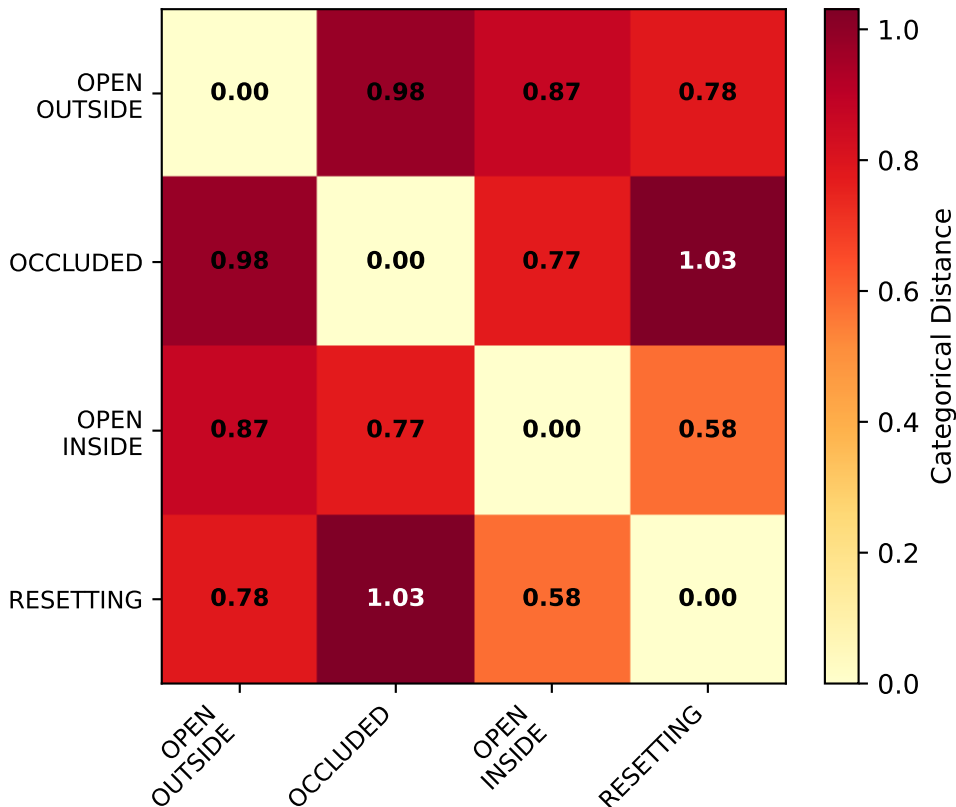
B. Free Energy Landscape



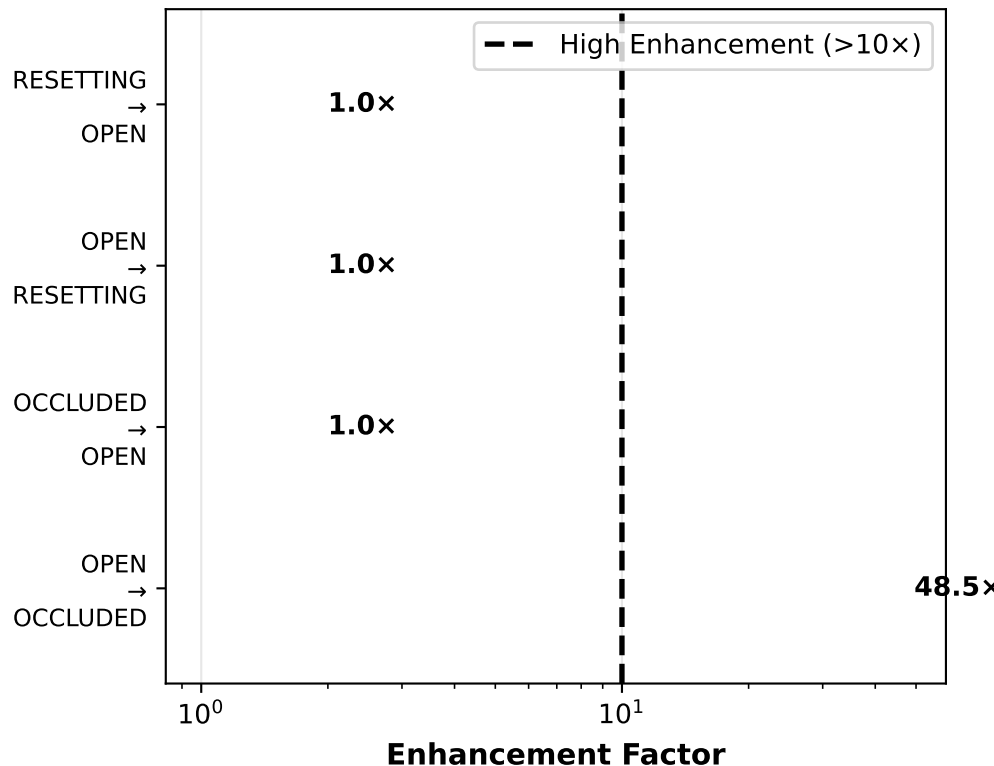
C. Volume-Frequency Relationship



D. S-Space Distance Matrix



E. Substrate Binding Enhancement



CONFORMATIONAL CYCLE SUMMARY

Total States: 4
Trajectory Points: 20
S-Space Distance: 14.73

STATE PROPERTIES:

OPEN_OUTSIDE:

Volume: 5000 Å³
Frequency: 3.80e+13 Hz
Energy: +0.0 kJ/mol
ATP: Bound

OCCLUDED:

Volume: 3000 Å³
Frequency: 4.50e+13 Hz
Energy: +15.0 kJ/mol
ATP: Bound

OPEN_INSIDE:

Volume: 4500 Å³
Frequency: 3.20e+13 Hz
Energy: -10.0 kJ/mol
ATP: Free

RESETTING:

Volume: 4000 Å³
Frequency: 3.50e+13 Hz
Energy: +5.0 kJ/mol
ATP: Free

KEY FINDINGS:

- Substrate binding enhances rate 48.5x
- Occluded→Inside transition fastest (1.87e15 s⁻¹)
- Energy minimum at OPEN_INSIDE (-10 kJ/mol)
- Maximum barrier at OCCLUDED (+15 kJ/mol)