Comprehensive Optical Design Analysis Report

Experiment: erent_v1_absorber

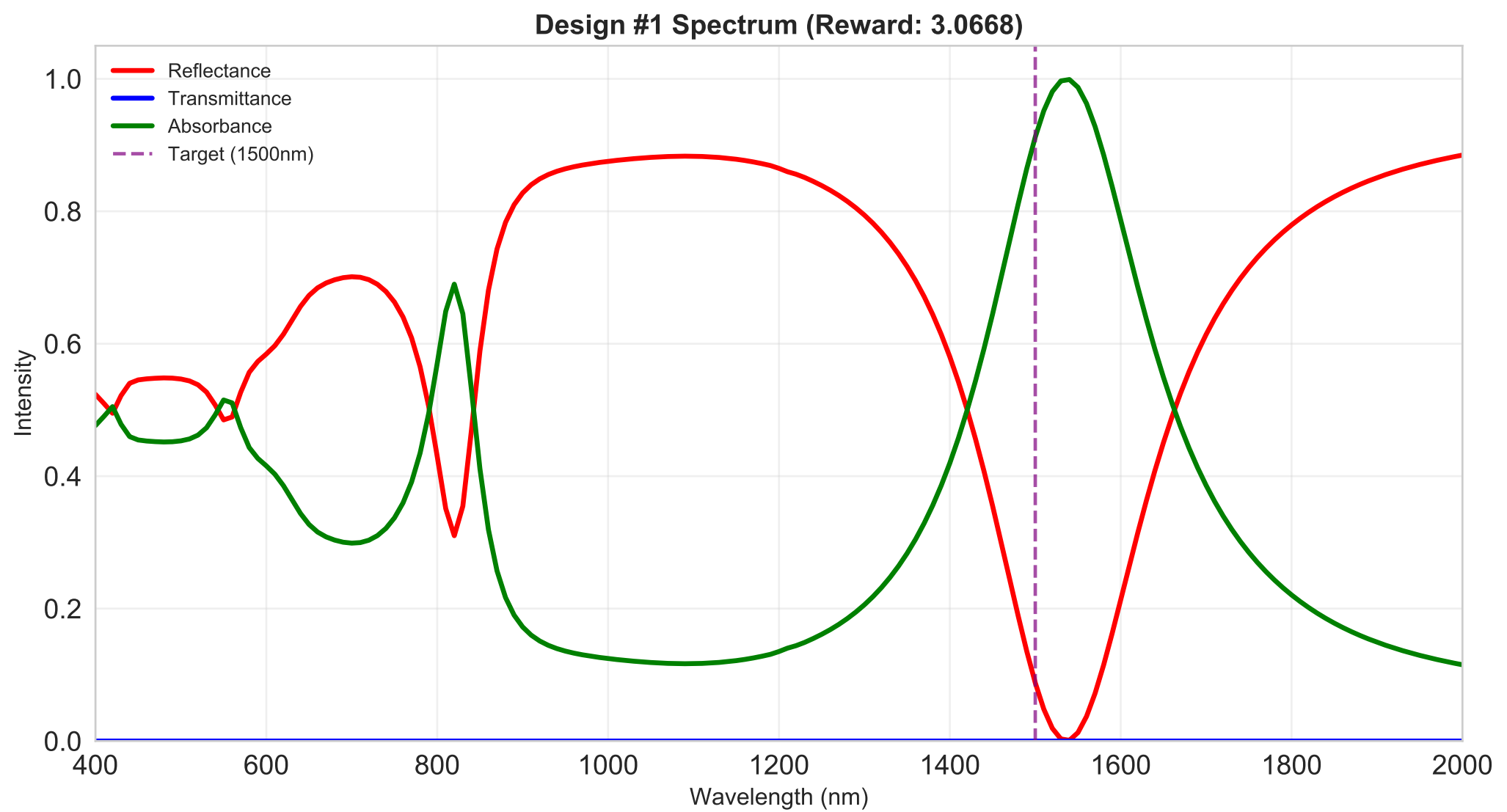
Number of designs analyzed: 5

Generated on: 2025-06-18 00:54

This report summarizes the results of an RL-based optical design experiment.

Key Findings:
• Best design reward: 3.066790
• Target absorption at 1500nm: 0.912
• Peak absorption: 0.999
• Materials used: TiO2, MgF2, Ge, SiO2, Al2O3


Training Progress Analysis
Average Episode Return
Average Return
Epoch
Maximum Episode Return
Max Return
Epoch
Episode Length
Episode Length
Epoch
Policy Entropy
Entropy
Epoch

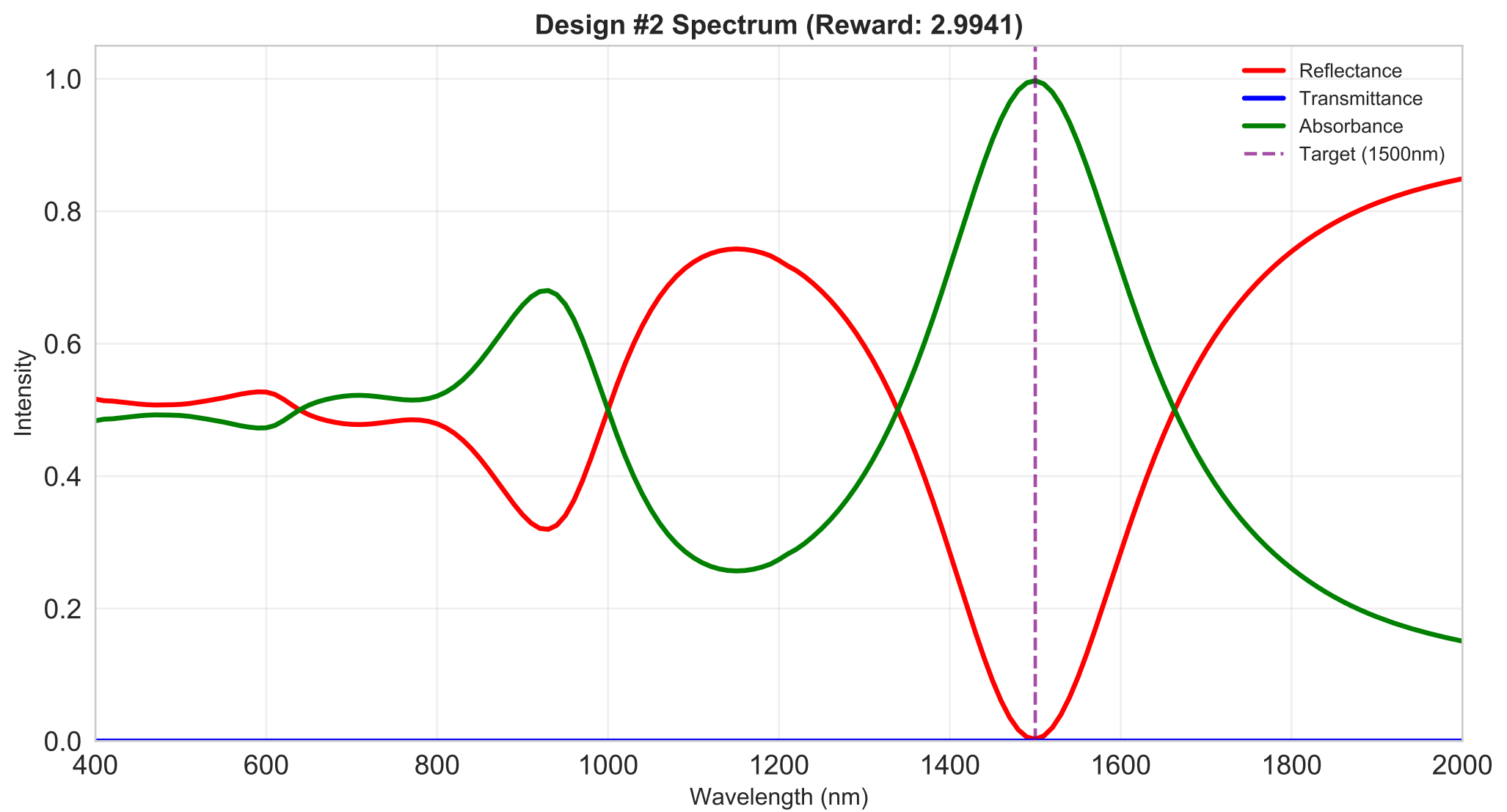


Design Parameters:

Materials: ['Ge', 'SiO2', 'SiO2', 'MgF2']
Thicknesses (nm): [40, 240, 190, 125]
Number of layers: 4
Reward: 3.066790

Key Metrics:

1500nm Absorption: 0.9121
Peak Absorption: 0.9990
Peak at: 1540 nm
Target Band Avg: 0.7864
80% Bandwidth: 110 nm

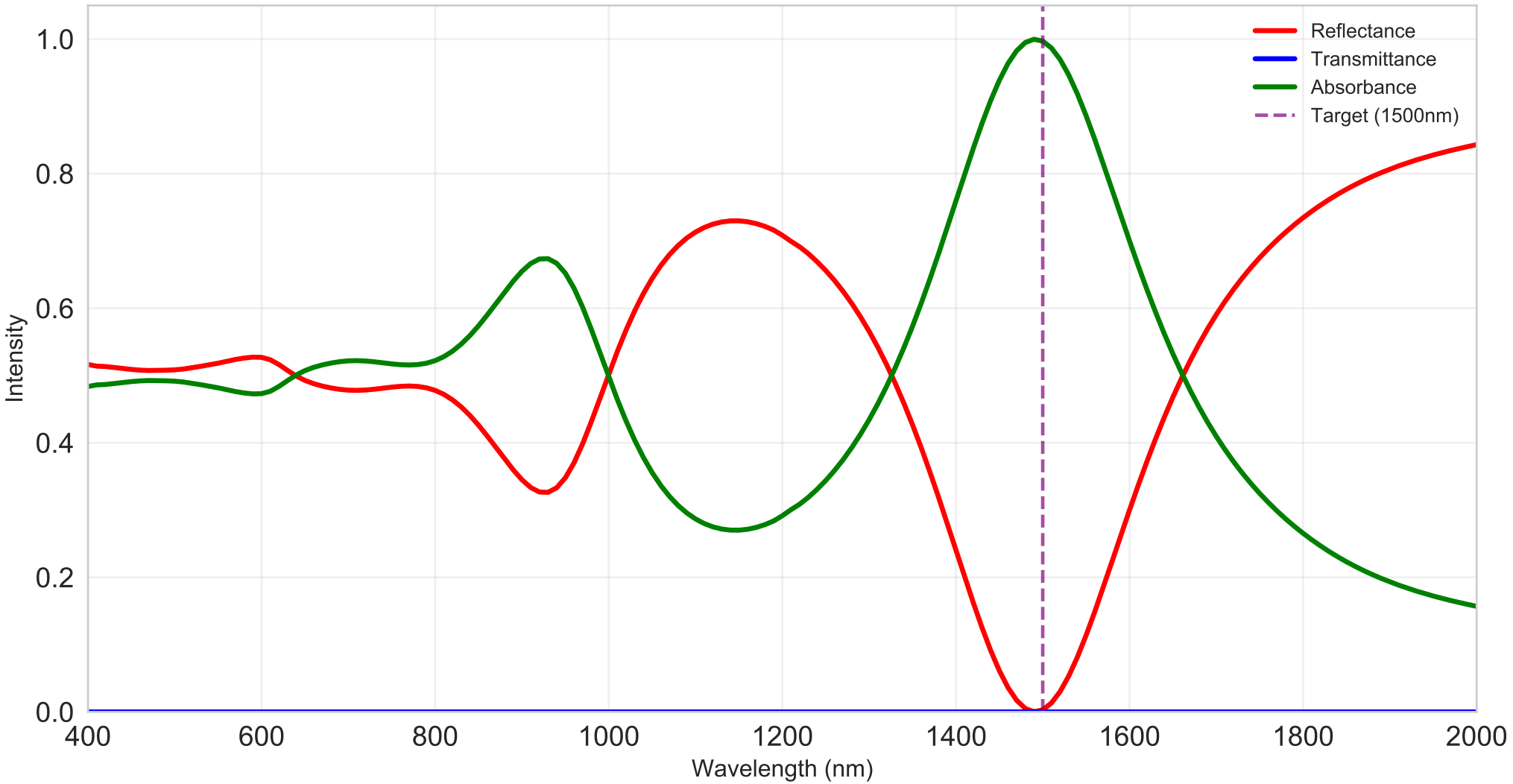


Design Parameters:

Materials: ['Ge', 'MgF2']
Thicknesses (nm): [195, 50]
Number of layers: 2
Reward: 2.994145

Key Metrics:

1500nm Absorption: 0.9972
Peak Absorption: 0.9972
Peak at: 1500 nm
Target Band Avg: 0.8891
80% Bandwidth: 140 nm

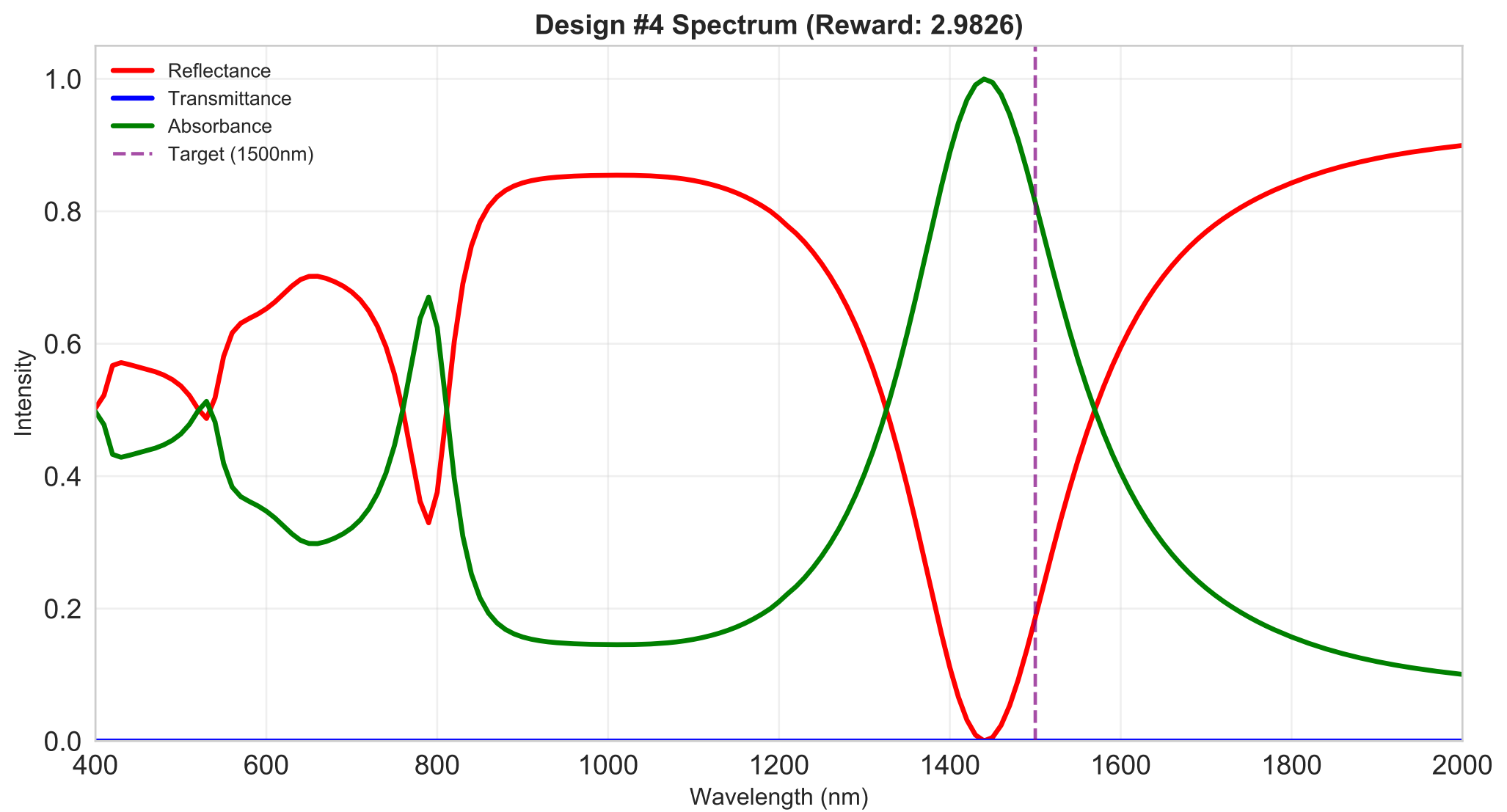


Design Parameters:

Materials: ['Ge', 'Ge', 'Al2O3']
Thicknesses (nm): [70, 125, 45]
Number of layers: 3
Reward: 2.988274

Key Metrics:

1500nm Absorption: 0.9970
Peak Absorption: 0.9998
Peak at: 1490 nm
Target Band Avg: 0.8971
80% Bandwidth: 150 nm

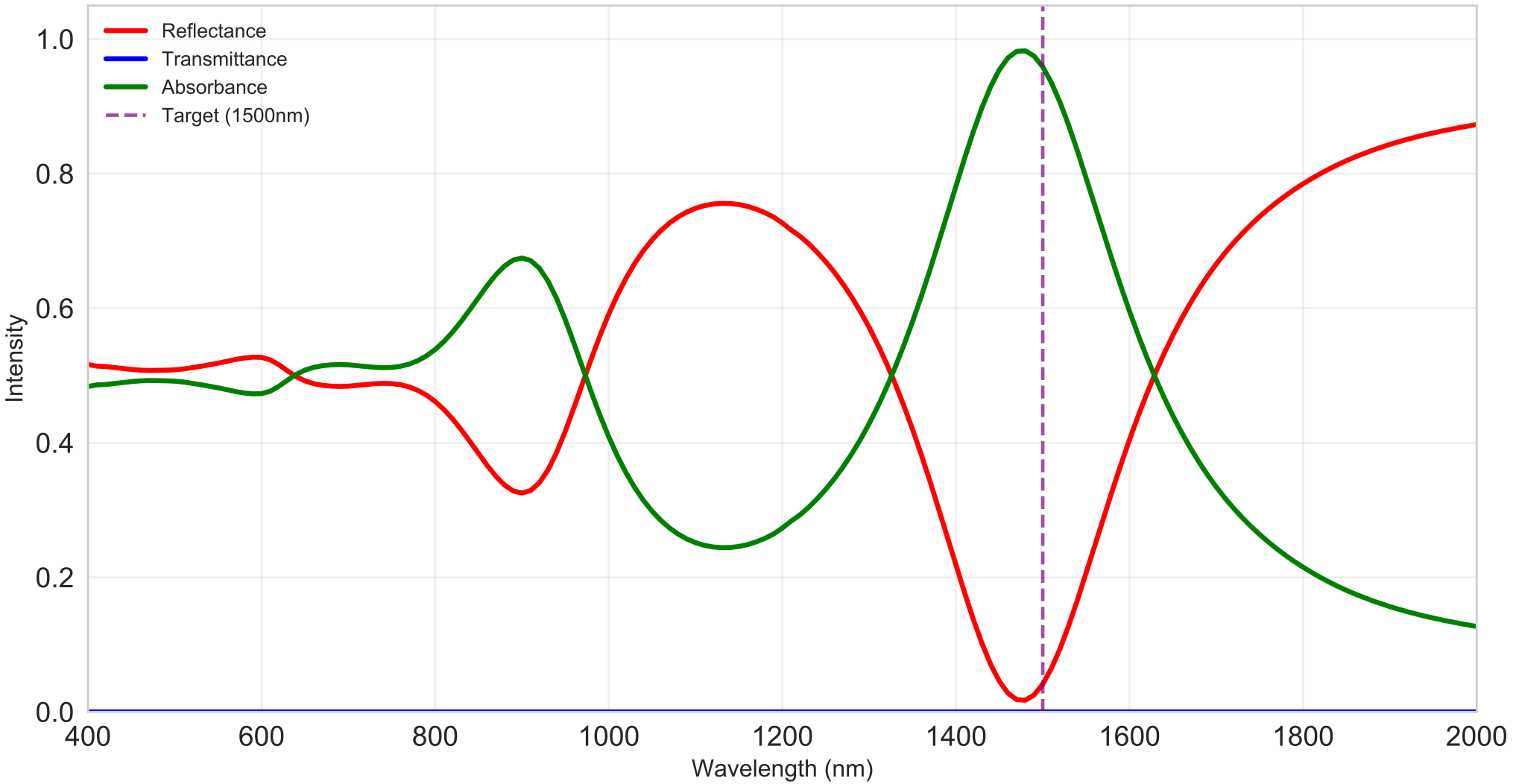


Design Parameters:

Materials: ['Ge', 'SiO2', 'MgF2', 'MgF2']
Thicknesses (nm): [35, 200, 190, 160]
Number of layers: 4
Reward: 2.982583

Key Metrics:

1500nm Absorption: 0.8139
Peak Absorption: 0.9998
Peak at: 1440 nm
Target Band Avg: 0.7777
80% Bandwidth: 110 nm

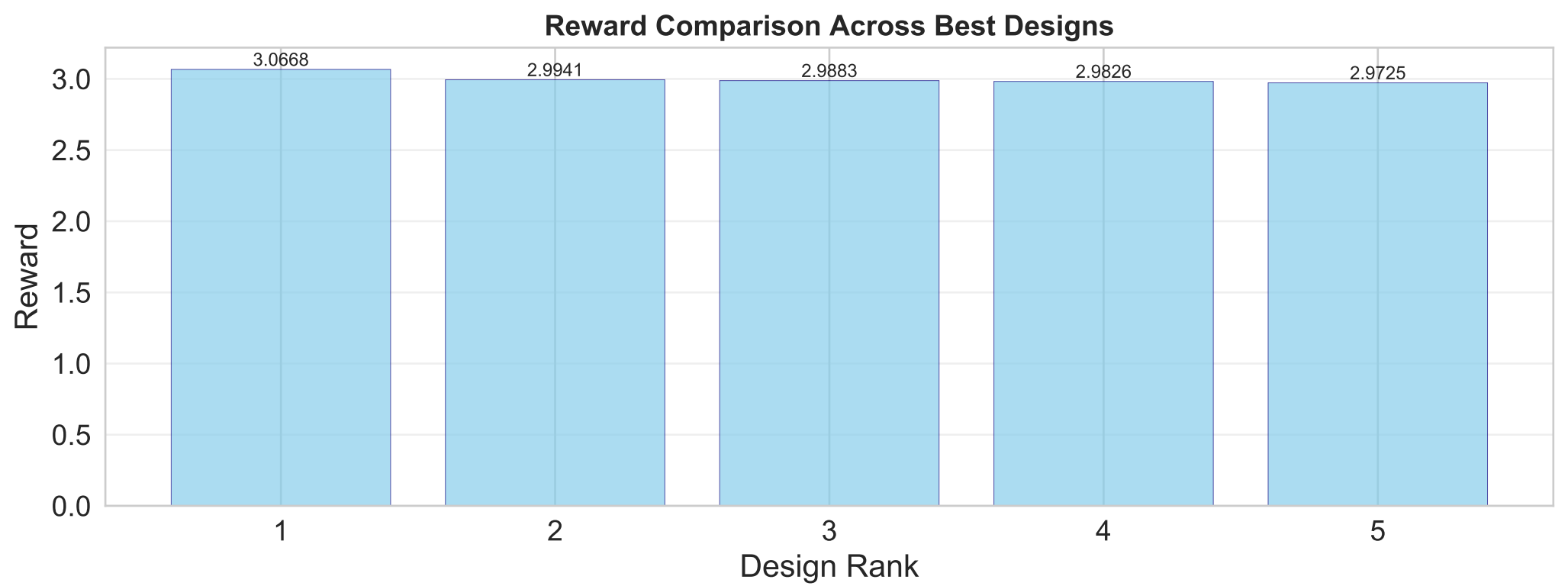


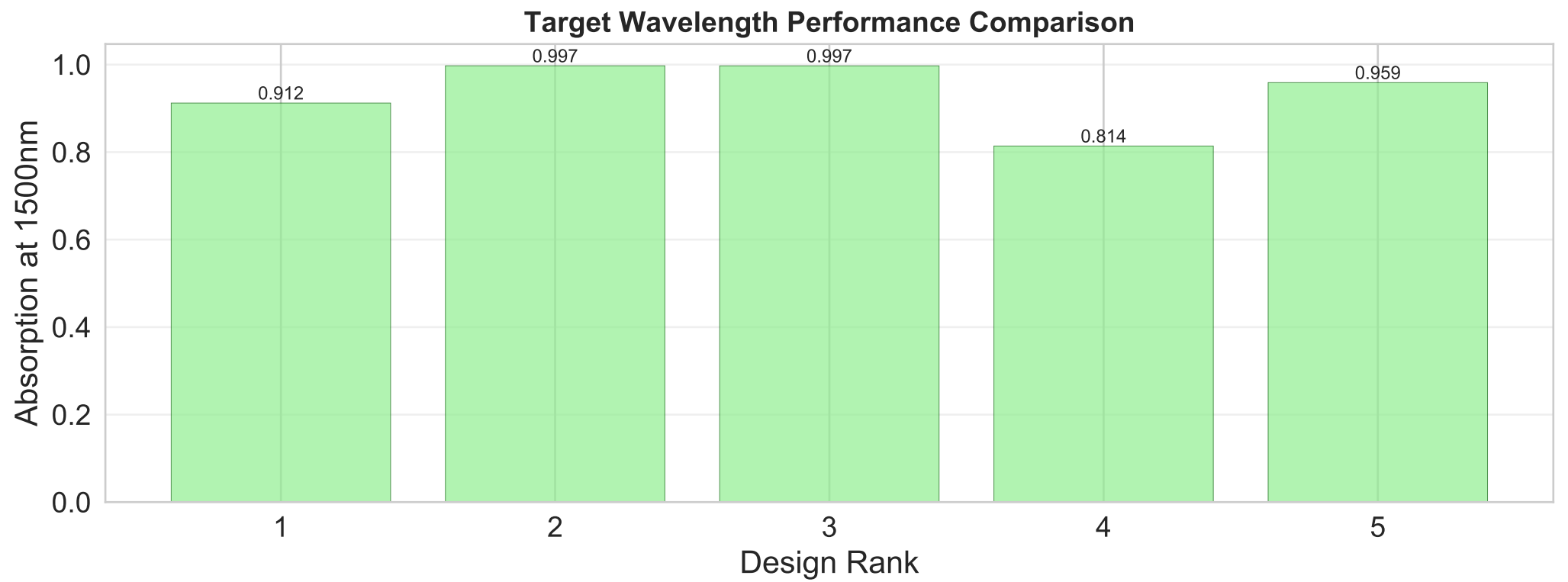
Design Parameters:

Materials: ['Ge', 'TiO2']
Thicknesses (nm): [180, 80]
Number of layers: 2
Reward: 2.972519

Key Metrics:

1500nm Absorption: 0.9588
Peak Absorption: 0.9827
Peak at: 1480 nm
Target Band Avg: 0.8614
80% Bandwidth: 130 nm


Reward Comparison Across Best Designs
Reward
Design Rank
3.0668
2.9941
2.9883
2.9826
2.9725
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1
2
3
4
5


Target Wavelength Performance Comparison
Absorption at 1500nm
Design Rank
0.912
0.997
0.997
0.814
0.959
0.0
0.2
0.4
0.6
0.8
1.0
1
2
3
4
5