Raman Spectrometer Quantum Defect Test Report

Test Report Identifier: RSP-001

Test Date: [Insert Date]

Test Location: [Insert Location]

Test Engineer: Madison J. Newell

Quality Engineer: Berhane

# 1. Test Objective

To document the performance evaluation of a Raman spectrometer using a 527 nm excitation laser, including spectral accuracy, resolution, and efficiency based on the test procedure RSP-001.

# 2. Test Conditions

Environmental Conditions: [Temperature, Humidity, Pressure]

Instrument Calibration: Verified using a silicon wafer as a reference sample.

Alignment Checks: Ensured proper positioning of collimating and focusing mirrors.

# 3. Data Analysis and Results

The quantum defect for each sample has been calculated using the Raman peak positions. Below are the results of the analysis:

Sample Data:

The analysis results are shown below (simplified table):

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sample Number | Wavelength (nm) | Intensity | Raman Peak (nm) | Resolution (FWHM, nm) | Quantum Defect | Calculated Quantum Defect |
| 1.0 | 520.0 | 526.327163358281 | 520.7809443381237 | 0.5032999084786146 | 0.001087579241645832 | 8.094433812368606e-05 |
| 2.0 | 532.2222222222222 | 414.6662742263441 | 520.5059180891727 | 0.5095794049571414 | 0.001187940711708571 | -0.0001940819108273217 |
| 3.0 | 544.4444444444445 | 478.9498940589339 | 520.5791918995166 | 0.4860625546426144 | 0.0008952258730216767 | -0.0001208081004834867 |
| 4.0 | 556.6666666666666 | 505.9229980192324 | 520.3753855532 | 0.468200241268612 | 0.00105897866495246 | -0.0003246144468000694 |
| 5.0 | 568.8888888888889 | 475.2920821073242 | 520.5614744445844 | 0.5952295799487688 | 0.001036820550607873 | -0.0001385255554156401 |
| 6.0 | 581.1111111111111 | 658.2302109974735 | 520.5819598412401 | 0.4985683879483002 | 0.0008921751173016312 | -0.0001180401587599818 |
| 7.0 | 593.3333333333334 | 568.7464660965024 | 520.7386549946128 | 0.5246197733837277 | 0.001105317769111859 | 3.865499461278432e-05 |
| 8.0 | 605.5555555555555 | 484.6926743328777 | 520.7513372644703 | 0.5347815307737707 | 0.0009182292200786176 | 5.133726447024856e-05 |
| 9.0 | 617.7777777777778 | 556.6371675192531 | 520.591058460306 | 0.6083664588422647 | 0.0009141677976624132 | -0.0001089415396940012 |
| 10.0 | 630.0 | 581.9171520387833 | 520.802510716474 | 0.4510668601185657 | 0.001003845685313558 | 0.0001025107164739438 |