# Appendices

## Particle size distribution

Powdered samples were passed through a range of sieve sizes including 38, 75, 150 and 250 µm. The particle size distribution is shown in Figure A.1. The effective particle size was then determined based on the weight percentage of particles in each size range (Table A.1).

|  |  |  |
| --- | --- | --- |
|  | Na-free sample | Na-doped sample |
| Effective particle size (µm) | 134 ± 10 | 111 ± 10 |

Table A.1. Effective particle size for samples with/without Na

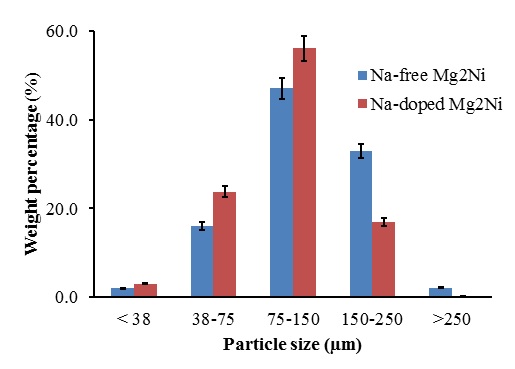


FIG A.1. Distribution of particle size for samples with/without Na

## Measurement of interphase boundary density

An example of the measurement of interphase boundary density between primary Mg2Ni/eutectic structures is shown in Figure B.1. ImageJ 1.47v software was used for the analysis. The final result is summarised in Table B.1 for a population of 10 samples.

|  |  |  |
| --- | --- | --- |
|  | Density of interphase boundary (Primary Mg2Ni/Eutectic) (µm/µm2) | |
| No. | Na-free Mg2Ni | Na-doped Mg2Ni |
| 1 | 3.63E-03 | 7.10E-03 |
| 2 | 3.99E-03 | 7.72E-03 |
| 3 | 4.07E-03 | 9.16E-03 |
| 4 | 3.78E-03 | 9.40E-03 |
| 5 | 4.00E-03 | 9.10E-03 |
| 6 | 3.38E-03 | 7.82E-03 |
| 7 | 4.01E-03 | 7.40E-03 |
| 8 | 3.79E-03 | 7.45E-03 |
| 9 | 3.64E-03 | 7.22E-03 |
| 10 | 3.88E-03 | 6.82E-03 |
| Median | **3.84E-03** | **7.59E-03** |
| Standard deviation | **0.21E-03** | **0.90E-03** |

Table B.1. Result summary for the measurement of density of interphase boundary for a population of 10 samples

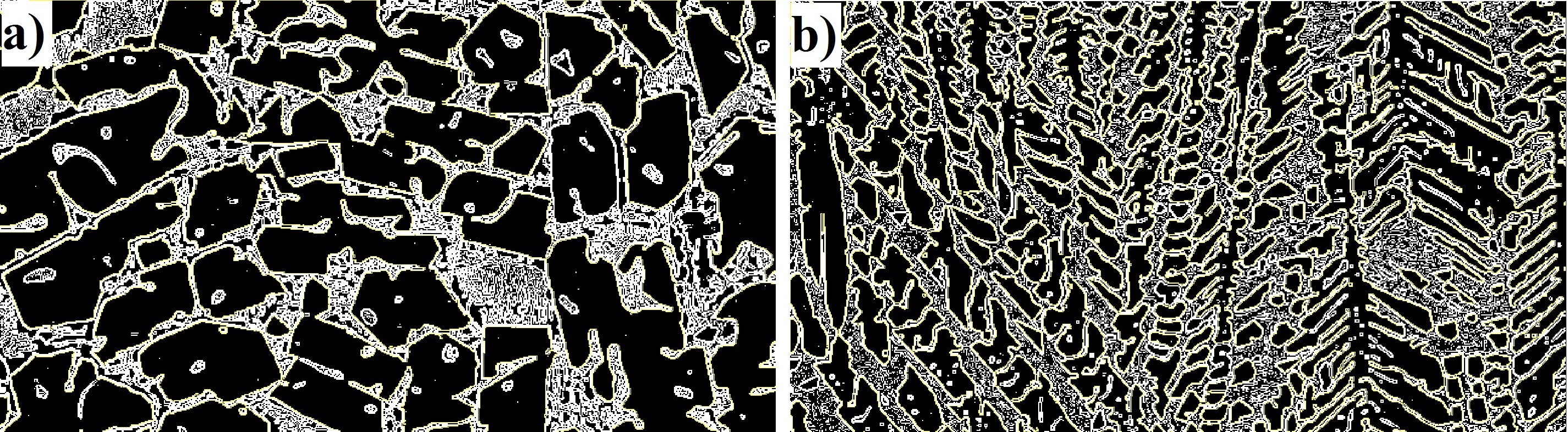


FIG B.1. An example for the measurement of interphase boundary using ImageJ software

a) Na-free Mg2Ni and b) Na-doped Mg2Ni