**Supplementary Table 1** Composition of AlSi10Mg alloy powder（wt.%）

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Element | Si | Fe | Mg | Mn | Ti | O | Al |
| Content | 10.23 | 0.17 | 0.41 | 0.013 | 0.044 | 0.045 | Bal. |



**Supplementary Figure 1** SEM image of AlSi10Mg powder

**Supplementary Table 2** Process parameters of different scanning strategies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Laser Power(W) | Scanning Spacing(mm) | Scanning Speed(mm·s-1) | Powder Thickness(μm) |
| First Scan | 300 | 0.12 | 1600 | 30 |
| Rescan | A1 | No Rescan |
| A2&A3 | 240 |
| A2&A3 | 270 |
| A2&A3 | 300 |
| A2&A3 | 330 |
| A2&A3 | 360 |



**Supplementary Figure 2** The design sketch of the printed AlSi10Mg parts