|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  | total metal loading is 4 wt. % on TNTs | | | |  |  |  |
|  |  | MW(Au)= | 196.9657 |  |  |  |  |
|  |  | MW(Ni)= | 58.6934 |  |  |  |  |
|  |  | w:w ratio Au:Ni | |  |  |  |  |
|  | Au wt % | 100 | 80 | 60 | 50 | 40 |  |
|  | Au | 4 | 3.2 | 2.4 | 2 | 1.6 |  |
|  | Ni | 0 | 0.8 | 1.6 | 2 | 2.4 |  |
|  | Ni wt % | 0 | 20 | 40 | 50 | 60 |  |
|  |  |  |  |  |  |  |  |
|  | molar ratio Au:Ni | |  |  |  |  |  |
|  | Au | 100 | 54.37856 | 30.89063 | 22.95768 | 16.57341 |  |
|  | Ni | 0 | 45.62144 | 69.10937 | 77.04232 | 83.42659 |  |
|  |  |  |  |  |  |  |  |
|  |  | w:w ratio Au:Ni | |  |  |  |  |
|  | Au wt % | 100 | 93 | 83.25 | 68.75 | 45 |  |
|  | Au | 4 | 3.72 | 3.33 | 2.75 | 1.8 |  |
|  | Ni | 0 | 0.28 | 0.67 | 1.25 | 2.2 |  |
|  | Ni wt % | 0 | 7 | 16.75 | 31.25 | 55 |  |
|  |  |  |  |  |  |  |  |
|  | molar ratio Au:Ni | |  |  |  |  |  |
|  | Au | 100 | 79.83457 | 59.69439 | 39.59797 | 19.60176 |  |
|  | Ni | 0 | 20.16543 | 40.30561 | 60.40203 | 80.39824 |  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  | total metal loading is 5 wt. % on TNTs | | | |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  | w:w ratio Au:Ni | |  |  |  |  |
|  | Au wt % | 100 | 80 | 60 | 52 |  |  |
|  | Au | 5 | 4 | 3 | 2.6 |  |  |
|  | Ni | 0 | 1 | 2 | 2.4 |  |  |
|  | Ni wt % | 0 | 20 | 40 | 48 |  |  |
|  |  |  |  |  |  |  |  |
|  | molar ratio Au:Ni | |  |  |  |  |  |
|  | Au | 100 | 54.37856 | 30.89063 | 24.40394 |  |  |
|  | Ni | 0 | 45.62144 | 69.10937 | 75.59606 |  |  |
|  |  |  |  |  |  |  |  |
|  |  | w:w ratio Au:Ni | |  |  |  |  |
|  | Au wt % | 100 | 91 | 74 | 52 |  |  |
|  | Au | 5 | 4.55 | 3.7 | 2.6 |  |  |
|  | Ni | 0 | 0.45 | 1.3 | 2.4 |  |  |
|  | Ni wt % | 0 | 9 | 26 | 48 |  |  |
|  |  |  |  |  |  |  |  |
|  | molar ratio Au:Ni | |  |  |  |  |  |
|  | Au | 100 | 75.08092 | 45.89094 | 24.40394 |  |  |
|  | Ni | 0 | 24.91908 | 54.10906 | 75.59606 |  |  |
|  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Total metal loading on applied catalyst ink | | | | |  |
|  |  |  |  |  |  |
| \*to prepare 1.5 mL catalyst ink: | | | |  |  |
| 1 | mL 5wt% nafion density= 0.874 g/mol | | | |  |
| 0.5 | mL water |  |  |  |  |
| 100 | mg catalyst powder (10 wt% CB+ 90 wt% TNTs) | | | | |
|  |  |  |  |  |  |
| total mass of solid components in catalyst ink after drying; | | | | | |
| nafion content= | | 43.7 | mg |  |  |
| powder content= | | 100 | mg |  |  |
|  |  |  |  |  |  |
| percentage of nafion in wt%= | | | 30.41058 |  |  |
| percentage of powder in wt%= | | | 69.58942 |  |  |
| percentage of metal coated TNTs in the the mixture in wt%= | | | | | 62.63048 |
|  |  |  |  |  | 0.626305 |
|  |  |  |  |  |  |
| total metal loading in the catalyst ink for 4 wt% | | | | | 2.505219 |
|  |  |  |  |  |  |
| total metal loading in the catalyst ink for 5 wt% | | | | | 3.131524 |