Claims

1. Noble metal nanoparticles supported on a support, wherein an average noble metal nanoparticle size is 2.0 nm or below, wherein a noble metal loading based on the total mass of the noble metal nanoparticles and the support is 60 wt% or more, and wherein the support comprises graphene.

2. The supported noble metal nanoparticles of claim 1, wherein the average size of the noble metal nanoparticles is greater than 1.7 nm and up to 2.0 nm.

3. The supported noble metal nanoparticles of claim 2, wherein the average size of the noble metal nanoparticles is greater than 1.8 nm and up to 2.0 nm.

4. The supported noble metal nanoparticles of claim 1, wherein the noble metal loading is 75 wt% or more.

5. The supported noble metal nanoparticles of claim 1, wherein the noble metal nanoparticles comprise nanoparticles of platinum, ruthenium, palladium, gold, silver, rhenium, rhodium, iridium, osmium, or a combination thereof.

6. The supported noble metal nanoparticles of claim 1, wherein the noble metal loading is more than 60 wt%.

7. The supported noble metal nanoparticles of claim 5, wherein the noble metal nanoparticles comprise platinum.

8. The supported noble metal nanoparticles of claim 1, wherein the average size of the noble metal nanoparticles is between 1.62 nm and 1.98 nm.

9. The supported noble metal nanoparticles of claim 8, wherein the noble metal nanoparticles comprise platinum.