Tohoku Univ. Technology

Method for producing metal catalyst capable of uniformly highly dispersing metal particles

Highly dispersible in various carriers

Overview

Precious metals are used as catalysts in various reaction systems, but their high price and scarcity have reduced their usage. Therefore, catalysts loaded with precious metals are generally prepared by dispersing and carrying noble metal particles in a nanoparticulate state on a support such as an oxide to maximize the surface area per amount of precious metal used. Conventional methods for producing noble metal catalysts have a problem that the dispersion of noble metal particles is poor and the particle size is uneven because the noble metal particles agglomerate during the heating process during metallization. Even if a method for producing a metal catalyst that can obtain highly dispersed particles is used, there is also a problem that the support is limited.

The present invention has made it possible to provide a method for producing a metal catalyst that can uniformly and highly disperse metal particles on various supports.

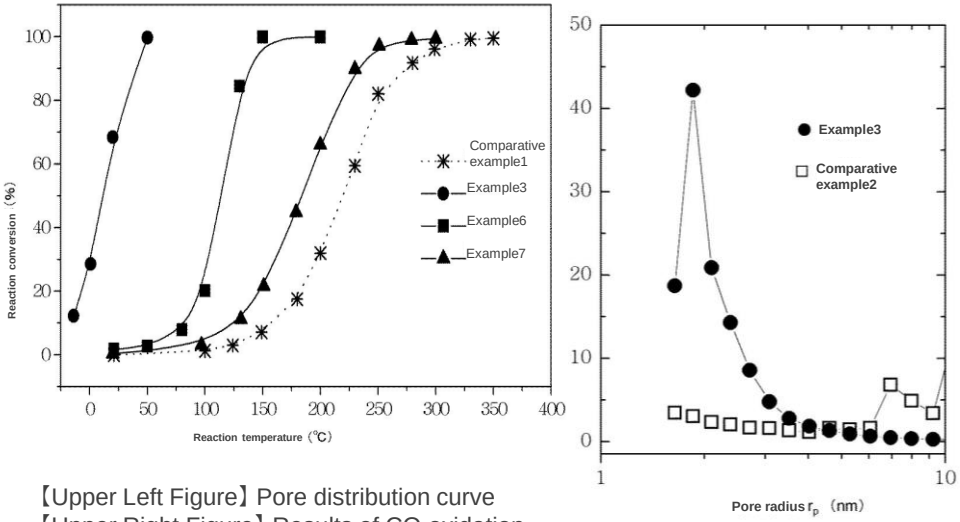
Effect・Product Application

＜Effect＞ Uniformly highly dispersed metal particles

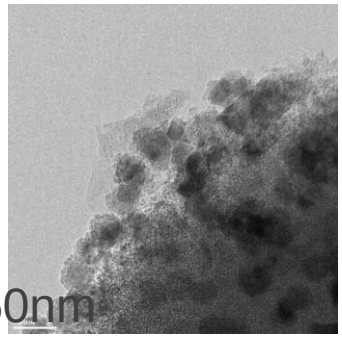
＜ Application example ＞
- ☐ Metal catalyst without limiting support
- ☐ Method for manufacturing metal catalyst
- ☐ CO oxidation catalyst

	Composition of the Al-based intermetallic compound	Raw materials per 5g of the Al-based intermetallic compound					Elution amount of Al (% by weight)	Specific surface area
		Al	Fe	Au	Pt	Cu		
Example1	$Al_{75.95}Fe_{24}Au_{0.05}$	3.0142	1.9709	0.0149			95	45
Example2	$Al_{75.6}Fe_{24}Au_{0.4}$	2.9486	1.9375	0.1139			96	28
Example3	$Al_{75}Fe_{24}Au_1$	2.8407	1.8824	0.2766			96	33
Example4	$Al_{72}Fe_{24}Au_4$	2.3855	1.6466	0.9679			96	38
Example5	$Al_{68}Fe_{24}Au_8$	1.9312	1.4105	1.6589			96	29
Example6	$Al_{75}Fe_{24}Pt_1$	2.8429	1.8834		0.2742		55	20
Example7	$Al_{75}Fe_{24}Cu_1$	2.9524	1.9549			0.0935	95	44
Comparative example1	$Al_{76}Fe_{24}$	3.0237	1.9763				94	36
Comparative example2	Composition of the catalyst: $Au\text{-}Fe_3O_4$							30

【 Upper Figure 】Test Sample Details for Metal Catalysts of Embodiments of the Invention



【Upper Left Figure】Pore distribution curve
【Upper Right Figure】Results of CO oxidation reaction tests of metal catalysts containing different metals
【 Bottom Right Figure】Transmission electron micrograph (T E M)of a metal catalyst



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