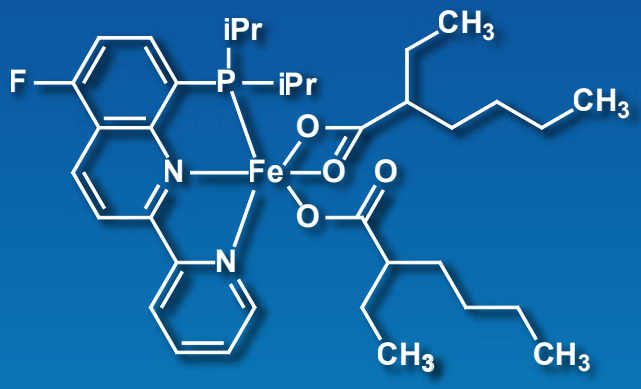
New

MATERIALS

TCI

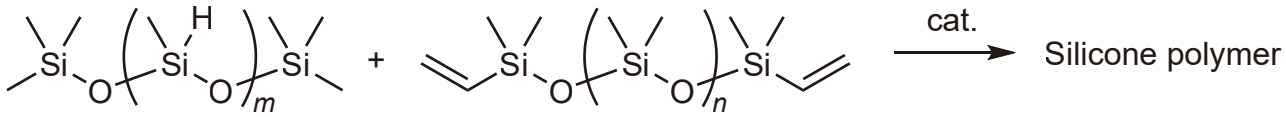
Rare Metal-Free Iron Catalyst for Silicone Curing



Bis(2-ethylhexanoyloxy)(2-pyridyl-5-fluoro-8-diisopropylphosphinoquinoline)iron(II)
200mg / 1g
[B6618]

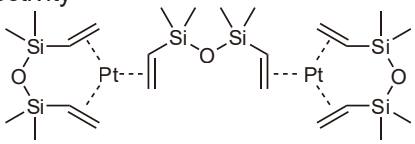
Platinum-catalyzed curing of silicones is widely used in the production of release coatings and silicone rubber products and is applied across various fields, ranging from industrial applications to medical materials and everyday consumer products such as cookware. Among silicone curing catalysts, platinum catalysts for hydrosilylation (e.g., Karstedt catalyst) are well known. Karstedt catalyst offers advantages such as high activity and ease of handling; however, they also have drawbacks, including the high cost of platinum and poor selectivity. In addition, during silicone manufacturing, it is extremely difficult to recover platinum catalysts incorporated into the resin, and as a result, most of the platinum is not recovered or reused. Furthermore, conventional platinum catalysts are prone to deactivation through a phenomenon known as "poisoning," in which their activity is reduced by reaction with components containing heteroatoms such as nitrogen, sulfur, and phosphorus. This makes it difficult to add additives or functional groups containing these elements to the material. B6618, which does not contain rare metals, exhibits high activity in hydrosilylation reactions while overcoming the drawbacks of conventional platinum catalysts.[1)]

Application (Synthesis of Silicone Resin)



Characteristics of Conventional Platinum Catalysts

- High activity
- Easy to handle
- Contains expensive platinum (and makes it difficult to recover platinum from the resin)
- Allows curing inhibition caused by the presence of heteroatoms
- Poor selectivity



Karstedt catalyst

Characteristics of the Iron Catalyst [B6618][1)]

- Contains iron, an abundant and inexpensive resource, as a catalyst (potential alternative to platinum catalysts)
- High solubility, allowing easy blending with silicone raw materials
- Very high catalytic activity (effective at 1–100 ppm)
- Resistant to poisoning by heteroatoms such as nitrogen, sulfur, and phosphorus, resulting in a broad substrate scope

Reference 1) Y. Seita, K. Yujiri, M. Kamitani, *Organometallics* **2025**, *44*, 1108. https://doi.org/10.1021/acs.organomet.5c00141

This product has been commercialized under the technical instruction of Professor Masahiro Kamitani, and under an invention license by Kitasato University.

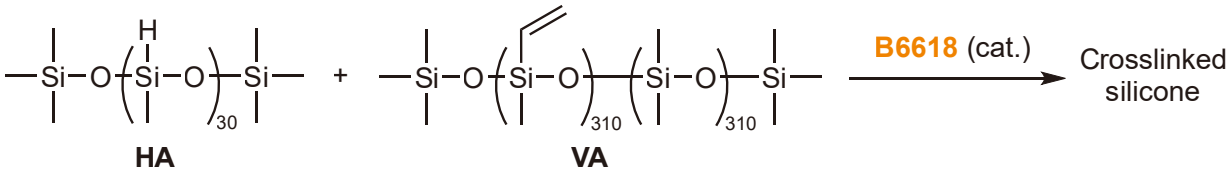
Related Products

Karstedt Catalyst (= Platinum(0) – 1,3-Divinyltetramethyldisiloxane Complex) (19.0-21.5% as Pt) (contains 1,3-Divinyltetramethyldisiloxane)	1g / 5g [P2075]
Dichloro[8-(diisopropylphosphino)-5-fluoro-2-(2-pyridinyl)quinoline]iron(II)	100mg [D5886]

Rare Metal-Free Iron Catalyst for Silicone Curing

Silicone Curing Reaction in the Presence of the Iron Catalyst [B6618][1)]

When a mixture of poly(methylhydrosiloxane) (HA) and a methylvinylsiloxane–dimethylsiloxane copolymer (VA) reacts in the presence of **B6618**, cured silicone rubber is formed. Reducing the catalyst loading increases the curing time; however, the curing reaction proceeds even at a catalyst concentration as low as 1 ppm. The color of the cured silicone rubber depends on the amount of the iron catalyst: at 100 ppm, a yellowish-brown rubber is obtained, whereas at 1 ppm, an almost colorless rubber is obtained.

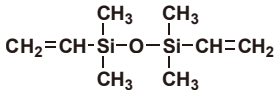


HA **VA**

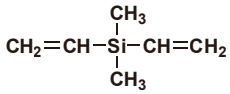
Using 1 ppm of the iron catalyst

Using 100 ppm of the iron catalyst

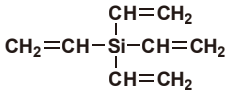
Related Products (divinylsilanes and oligovinylsilanes)



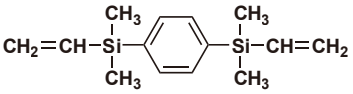
1,3-Divinyltetramethyldisiloxane
[D1780]



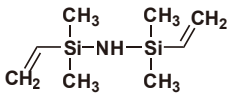
Dimethyldivinylsilane
[D4866]



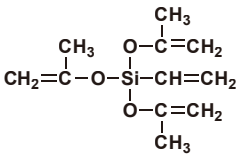
Tetravinylsilane
[T4058]



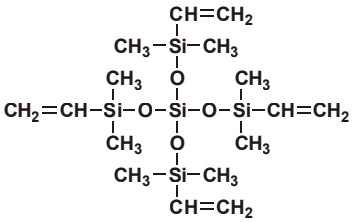
1,4-Bis(dimethylvinylsilyl)benzene
[B6054]



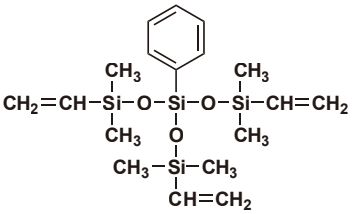
1,3-Divinyl-1,1,3,3-tetramethyldisilazane
[D1769]



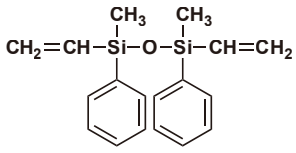
Tris(isopropenyloxy)(vinyl)silane
[V0185]



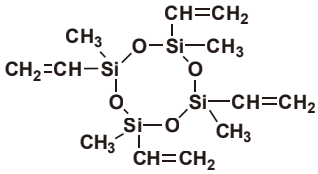
Tetrakis[dimethyl(vinyl)silyloxy]silane
[T3517]



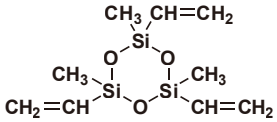
Tris[dimethyl(vinyl)siloxy]phenylsilane
[D5264]



1,3-Dimethyl-1,3-diphenyl-1,3-divinyldisiloxane
[D5557]



2,4,6,8-Tetramethyl-2,4,6,8-tetravinylcyclotetrasiloxane
[T2523]



2,4,6-Trimethyl-2,4,6-trivinylcyclotrisiloxane
[T3745]

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