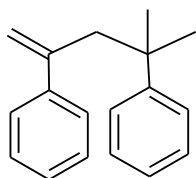


## 1 Introduction

**NOFMER<sup>®</sup> MSD** is a suitable Chain Transfer Agent (CTA) for polymers containing styrene such as PS, AS polymers or SB latexes. In addition, **NOFMER<sup>®</sup> MSD** can be used as an addition agent with functions of a crosslinking co-agent and a retarder for LDPE crosslinking. Because of these features, **NOFMER<sup>®</sup> MSD** is used in the production of coating materials, high-voltage electric cables and others.

## 2 Chemical structure

'2,4-diphenyl-4-methyl-1-pentene' is a main component in **NOFMER<sup>®</sup> MSD**. The chemical structure is as follows.



2,4-Diphenyl-4-methyl-1-pentene  
( $\alpha$ -Methyl Styrene Dimer)  
(CAS Registry No; 6362-80-7)

## 3 Physical properties

The physical properties of **NOFMER<sup>®</sup> MSD** are as follows.

Table. Physical properties

Appearance	Colorless liquid	
Purity	$\geq 93\%$	
Specific Gravity	0.992 (20 °C)	
Viscosity	18.0 cps (20 °C)	
Boiling Point	1013 Pa	300-318 °C
	798 Pa	150-152 °C
Flash point	150 °C	

## 4 Features of NOFMER<sup>®</sup> MSD

- ① **NOFMER<sup>®</sup> MSD** works as a CTA for PS, AS polymers or SB latexes, etc.
- ② **NOFMER<sup>®</sup> MSD** works as a crosslinking co-agent and a retarder for LDPE crosslinking (XLPE).
- ③ **NOFMER<sup>®</sup> MSD** has less odor compared to mercaptans or other retarders (BHT etc).

## 5 Application of NOFMER<sup>®</sup> MSD

**NOFMER<sup>®</sup> MSD** is used in the production of coating materials as a CTA or covering of high-voltage electric cables as a crosslinking co-agent and a retarder.

## 6 Technical data of NOFMER<sup>®</sup> MSD as a CTA

In the point of view of the chain transfer constant, **NOFMER<sup>®</sup> MSD** is a suitable CTA because an excellent transfer constant should be between 0.01 and 1.0. Furthermore, **NOFMER<sup>®</sup> MSD** can control low molecular weight and molecular weight distribution than NDM. In addition, **NOFMER<sup>®</sup> MSD** can reduce molecular weight with increasing dosage, while keeping molecular weight distribution.

Table. Chain transfer constant ( $C_{tr}$ )

Chain transfer constant	$C_{tr}$ at 60 °C Monomer	
	St	MMA
NOFMER <sup>®</sup> MSD	0.21	0.074
<i>n</i> -butyl mercaptan (NBM)	22.0	0.67
<i>t</i> -butyl mercaptan (TBM)	3.7	-
<i>n</i> -dodecyl mercaptan (NDM)	14.8	-

$C_{tr}$  of Mercaptans; Polymer Handbook 3<sup>rd</sup> edition

Table. Polymerization of styrene

CTA	$M_w \times 10^{-4}$	$M_w / M_n$
None	32.1	2.8
NOFMER <sup>®</sup> MSD	0.5 wt%	11.1
	1.0 wt%	8.0
	2.0 wt%	4.9
<i>n</i> -dodecyl mercaptan (NDM)	0.5 wt%	25.3
	1.0 wt%	26.4
	2.0 wt%	23.7

## 7 Technical data of NOFMER® MSD as a crosslinking co-agent and a retarder

**NOFMER® MSD** can make a highly crosslinked polymer as a crosslinking co-agent at crosslinking temperature (180°C).

In addition, **NOFMER® MSD** can prevent scorch effectively as a retarder at kneading temperature (145°C). **NOFMER® MSD** has well balanced results in both torque value and scorch time.

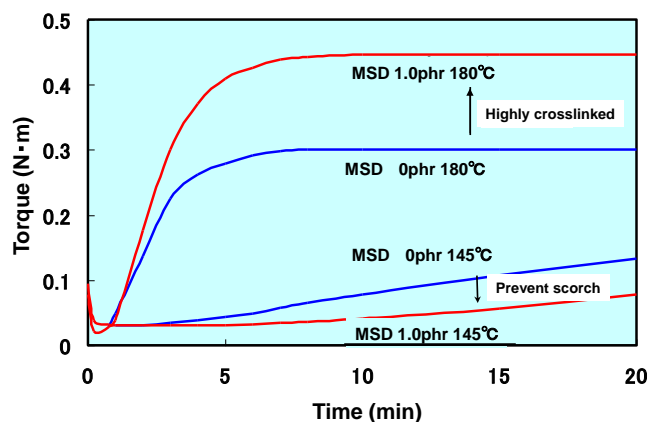


Fig. Time-torque curve for LDPE crosslinking

Table. Comparison data of NOFMER® MSD with other additives

Additives		Amounts (phr)	Max. torque (N.m) (180°C)	Scorch time (min) (145°C)
Type				
—		—	0.30	6
NOFMER® MSD		1.0	0.45	17
Co-agent	TAIC	1.0	0.44	3
	TMPT	1.0	0.35	7
Retarder	BHT	0.2	0.28	9
	2-Mercaptobenzothiazol	0.5	0.10	25

TAIC; Triallyl isocyanurate, TMPT; Trimethylolpropane trimethacrylate

BHT; 2,6-Di-*t*-butyl-*p*-cresol

Scorch time; Time to reach 10% of Max. torque at scorch-test temp (145°C).

## 8 Packing Information

- ◆ Package style; Drum
- ◆ Quantity; 200KG (440 lb)
- ◆ Drum size ; Φ585 × 890 mm (Φ23.0 × 35.0 in)
- ◆ Transportation Info; Class 9, UN 3082, PG III

## 9 Contact us

### **NOF CORPORATION**

#### **Functional Chemicals & Polymers Division**

20-3, Ebisu 4-Chome, Shibuya-ku, Tokyo 150-6019 Japan

TEL : +81-3-5424-6838 FAX : +81-3-5424-6814

E-mail; modiper@nof.co.jp

URL : <http://www.nof.co.jp/>

### **NOF AMERICA CORPORATION**

One North Broadway, Suite 912, White Plains, NY 10601 USA

TEL : +1-914-681-9790 FAX : +1-914-681-9791

E-mail; info@nofamerica.com

URL : <http://www.nofamerica.com>

### **NOF EUROPE GmbH**

Mainzer Landstrasse 46, FBC 60325 Frankfurt am Main Germany

TEL : +49-69-7706-100-0 FAX : +49-69-7706-100-10

E-mail; info@nofeurope.com

URL : <http://www.nofeurope.com>

### **NOF (Shanghai) Co., Ltd.**

Room 2402, 24F, Huaning Plaza North Building, No.300

Xuanhua Road, Changning District, Shanghai 200050, P.R.China

TEL : +86-21-6210-1100 (Ext.106) FAX : +86-21-3208-0270

E-mail; info@nof.cn

### **PT. NOF MAS CHEMICAL INDUSTRIES**

#### **Singapore Branch**

10 Anson Road #18-09 International Plaza, SINGAPORE 079903

TEL : +65-6223-3796 FAX : +65-6223-7379

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1<sup>st</sup> Edition, Aug. 2016