

## Product Information

### Lipodisq® Styrene:Maleic Anhydride Copolymer 4:1

Catalog Number **SAE0081**

Storage Temperature  $-20\text{ }^{\circ}\text{C}$

#### Product Description

Membrane proteins have historically proven to be a technically difficult class of proteins to study. This is primarily due to the difficulty of maintaining their solubility, stability, and function outside of their original hydrophobic and lipophilic contexts, in standard aqueous experimental conditions. Several experimental methodologies, such as Nanodisc technology, have been developed to enable the study of isolated membrane proteins in more conventional hydrophilic laboratory environments. Polymers of styrene and maleic acid (SMA) have emerged as an additional tool to facilitate the solubilization of membrane proteins.<sup>1-4</sup>

Lipodisq® polymers contain styrene and maleic acid monomer units. Lipodisq polymers may be used to form nano-sized discoidal particles that are suitable for incorporation of membrane proteins.<sup>5,6</sup> Lipodisq polymers can solubilize commonly used lipids, e.g. dimyristoylphosphatidylcholine (DMPC), without the use of detergents.<sup>7</sup> In general, Lipodisq polymers are potentially useful in mitigating the use of detergents for solubilization of membrane proteins.<sup>1,7-9</sup>

This product is the anhydride form of the SMA polymer, with the styrene and maleic acid monomers present in the polymer in a 4:1 ratio. Of the four standard SMA ratios, 1:1, 2:1, 3:1, and 4:1, the SMA 4:1 polymer is the most hydrophobic polymer of the group.<sup>10,11</sup>

Adding sufficient base (e.g. KOH, NaOH) causes hydrolysis of each anhydride moiety into two carboxylic acid/carboxylate groups. For preparation of an initial stock solution, one publication reports initial solubilization of the SMA 4:1 polymer in a “minimal amount” of tetrahydrofuran, prior to addition of NaOH.<sup>10</sup>

#### Product Profile

Functional pH range: 8.5–10.5

$M_w$  (weight average):  $\sim 10,500$  Da

$M_n$  (number average):  $\sim 4,500$  Da

#### Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

#### References

1. Knowles, T.J. *et al.*, *J. Am. Chem. Soc.*, **131(22)**, 7484-7485 (2009).
2. Dörr, J.M. *et al.*, *Eur. Biophys. J.*, **45(1)**, 3-21 (2016).
3. Swainsbury, D.J.K. *et al.*, *Biochim. Biophys. Acta*, **1859(10)**, 2133-2143 (2017).
4. Domínguez Pardo, J.J. *et al.*, *Biophys. J.*, **115(1)**, 129-138 (2018).
5. Zhang, R. *et al.*, *Biochim. Biophys. Acta.*, **1848(1 Pt B)**, 329-333 (2015).
6. Cuevas Arenas, R. *et al.*, *Sci. Rep.*, **7**, 45875 (2017).
7. Orwick-Rydmark, M. *et al.*, *Nano Lett.*, **12(9)**, 4687-4692 (2012).
8. Orwick, M.C. *et al.*, *Angew. Chem. Int. Ed. Engl.*, **51(19)**, 4653-4657 (2012).
9. Dörr, J.M. *et al.*, *Proc. Nat. Acad. Sci. USA*, **111(52)**, 18607-18612 (2014).
10. Craig, A.F. *et al.*, *Biochim. Biophys. Acta*, **1858(11)**, 2931-2939 (2016).
11. Grethen, A. *et al.*, *Sci. Rep.*, **7**, 11517 (2017).

Lipodisq is a registered trademark of Malvern Cosmeceuticals.

GCY,MAM 08/18-1