US005326484A

United States Patent [19]

Nakashima et al.

[11] Patent Number: 5,326,484

[45] Date of Patent: Jul. 5, 1994

[54] MONODISPERSE SINGLE AND DOUBLE EMULSIONS AND METHOD OF PRODUCING SAME

[75] Inventors: Tadao Nakashima; Masataka Shimizu; Masato Kukizaki, all of Miyazaki, Japan

[73] Assignee: Miyazaki-Ken, Japan

[21] Appl. No.: 906,282

[22] Filed: Jun. 29, 1992

[51] Int. Cl.[5] B01J 13/00

[52] U.S. Cl. 252/314; 252/308; 252/309; 252/312; 366/340; 366/348

[58] Field of Search 252/308, 309, 312, 314; 366/340, 348

[56] References Cited

U.S. PATENT DOCUMENTS

1,330,174	2/1920	De Cew	252/314
3,823,091	7/1974	Samejima et al.	252/312
4,013,475	3/1977	Liebowitz et al.	252/309 X
4,201,691	5/1980	Asher et al.	252/314
4,369,123	1/1983	Selwitz et al.	252/312
4,383,767	5/1983	Jido	366/348 X
4,621,023	11/1986	Redziniak et al.	252/314 X
4,657,875	4/1987	Nakashima et al.	501/39
4,804,495	2/1989	Bouchez et al.	252/312
4,966,779	10/1990	Kirk	252/312 X

OTHER PUBLICATIONS

Rosen, Milton, J., *Surfactants and Interfacial Phenomena,* (John Wiley & Sons, New York, 1978), pp. 184–186.

Primary Examiner—Richard D. Lovering
Attorney, Agent, or Firm—Larson and Taylor

[57] ABSTRACT

The invention provides monodisperse single emulsions which have a mean emulsion particle size within the range of 0.3 to 40 μm and are substantially free of emulsion particles having a particle size smaller than 50% of the mean particle size, double emulsions which have a mean emulsion particle size within the range of 0.3 to 40 μm and whose internal phase concentration is controlled substantially uniformly within the range of 1% to 70%, and methods of producing these emulsions.

5 Claims, 15 Drawing Sheets