



US006339666B2

(12) **United States Patent**  
Szum et al.

(10) **Patent No.:** US 6,339,666 B2  
(45) **Date of Patent:** Jan. 15, 2002

(54) **RADIATION-CURABLE OPTICAL GLASS FIBER COATING COMPOSITIONS, COATED OPTICAL GLASS FIBERS, AND OPTICAL GLASS FIBER ASSEMBLIES**

(75) Inventors: **David M. Szum**, Elmhurst; **Chander P. Chawla**, Batavia; **James R. Petisce**, West Dundee; **John T. Vandenberg**, Barrington; **George Pasternack**, Riverwoods; **Timothy E. Bishop**, Algonquin; **Paul E. Snowwhite**, Elgin; **Edward P. Zahora**, Naperville, all of IL (US); **Stephen C. Lapin**, Waterford, WI (US)

|             |         |                |
|-------------|---------|----------------|
| 4,474,830 A | 10/1984 | Taylor         |
| 4,496,210 A | 1/1985  | Ansel et al.   |
| 4,624,994 A | 11/1986 | Ansel          |
| 4,636,223 A | 1/1987  | Mehl et al.    |
| 4,660,927 A | 4/1987  | Kondow et al.  |
| 4,822,850 A | 4/1989  | Yashuda et al. |
| 4,844,604 A | 7/1989  | Bishop et al.  |
| 4,900,126 A | 2/1990  | Jackson et al. |
| 4,913,859 A | 4/1990  | Overton et al. |
| 5,011,260 A | 4/1991  | Marx et al.    |
| 5,033,335 A | 7/1991  | Yatsu et al.   |
| 5,037,763 A | 8/1991  | Petisce        |

(List continued on next page.)

**FOREIGN PATENT DOCUMENTS**

(73) Assignee: **DSM N.V.**, Heerlen (NL)  
(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

|    |            |        |
|----|------------|--------|
| CA | 2171504    | 9/1996 |
| DE | 4302327    | 8/1994 |
| EP | 104 864 B1 | 4/1984 |

(List continued on next page.)

**OTHER PUBLICATIONS**

(21) Appl. No.: **09/838,140**  
(22) Filed: **Apr. 20, 2001**

**Related U.S. Application Data**

(63) Continuation of application No. 09/035,771, filed on Mar. 6, 1998, which is a continuation-in-part of application No. 08/877,585, filed on Jun. 17, 1997, now abandoned, which is a continuation-in-part of application No. 08/840,893, filed on Apr. 17, 1997, now abandoned, which is a continuation-in-part of application No. 08/745,790, filed on Nov. 8, 1996, now abandoned.

Properties of the R1055 coating composition, which was commercially available before November 1995.  
Properties of the 950-106 coating composition, which was commercially available before November 1995.  
Properties of the 3471-1-129 coating composition, which was commercially available before November 1995.

(List continued on next page.)

*Primary Examiner*—John D. Lee  
(74) *Attorney, Agent, or Firm*—Pillsbury Winthrop LLP

(51) **Int. Cl.**<sup>7</sup> ..... **G02B 6/22**; C08F 2/48  
(52) **U.S. Cl.** ..... **385/128**; 385/141; 385/145; 522/178  
(58) **Field of Search** ..... 385/123-128, 385/141, 143, 145; 522/172-183, 904, 905

(57) **ABSTRACT**  
Optical fiber coatings are disclosed having excellent ribbon stripping and adhesion behavior. The coatings are radiation-curable. The excellent stripping and adhesion behavior can be achieved by several means which include by use of additives, by use of radiation-curable oligomers having higher molecular weight, or by use of coatings having certain thermal properties. Combination of means can be employed. Stripping behavior can be measured by crack propagation and fiber friction measurements.

(56) **References Cited**  
**U.S. PATENT DOCUMENTS**

|             |         |              |
|-------------|---------|--------------|
| 3,984,172 A | 10/1976 | Miller       |
| 4,472,021 A | 9/1984  | Ansel et al. |

**20 Claims, 11 Drawing Sheets**

