

Creation of a Novel Bio-Based Adhesive Using Euglena-Derived Materials to Bond Automotive Structural Components

1 なぜ、易解体接着剤が必要なのか？

2 私たちがミドリムシを使う理由

3 ミドリムシ接着剤はホットメルト接着剤

Figure 1 consists of three panels. Panel (a) is a light micrograph of a green, rod-shaped organism labeled 'ミドロシム' (Mydrosmidium). Panel (b) is a scanning electron micrograph (SEM) of 'パラミロン粒子' (Paramylon granules), showing several oval-shaped granules with a 5 μm scale bar. Panel (c) is a chemical structure diagram of 'パラミロン' (Paramylon), showing a chain of 'ブドウ糖' (D-glucose) units linked by 1,6-glycosidic bonds, with a benzene ring attached to the C6 of the terminal unit. The text '約2,000個のブドウ糖' (Approximately 2,000 glucose units) is written below the chain.

Figure 1 illustrates the synthesis of Paralimon Ester and its application. The process begins with Paralimon, a cyclic oligomer of 1,3:2,6-dideoxy-1,6-dihydroxy-2,3,6-trideoxy-β-D-glucopyranose. This is reacted with fatty acid-derived groups (indicated by red circles) through a chemical reaction (化学変性) to form Paralimon Ester. The Paralimon Ester is then subjected to heat pressing (熱プレス) to form a film (フィルム状) with a thickness of 10 mm, which is then attached to a substrate (ミドリムシ接着剤).

シロクマだって持ち上げられます！ミドリムシからできた、自動車用構造材料のバイオベース接着剤

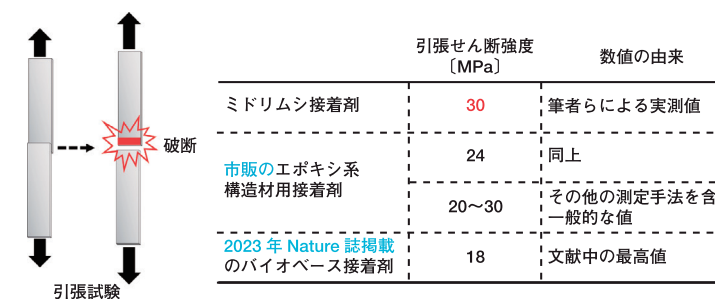


Figure 10 illustrates the comparison of disassembly methods for the cardboard box, showing the process before and after heating, and the resulting adhesion strength retention rate over multiple disassembly cycles.

加熱前 (Before Heating): The process involves pulling the box apart with hands (左右に手で引っ張る), maintaining adhesion (接着維持), and then easily disassembling it (易解体).

加熱後 (After Heating): The process follows a similar sequence: pulling with hands (左右に手で引っ張る), maintaining adhesion (接着維持), and easy disassembly (易解体).

アルミニウム板接着の引張せん断強度保持率 [%] (Aluminum plate adhesion tensile strength retention rate [%]): The graph shows the retention rate of the aluminum plate adhesion strength over four disassembly cycles (解体の繰り返し数).

Legend:

- Blue dashed line with arrows: 解体 (Disassembly)
- Red dashed line with arrows: 再接着 (Re-adhesion)

Data points (approximate values from the graph):

解体の繰り返し数 (Disassembly Cycle)	解体 (Disassembly) [%]	再接着 (Re-adhesion) [%]
1	100	100
2	90	100
3	90	100
4	100	100

4 ミドリムシ接着剤はどれほどの強さか

5 加熱による易解体と再利用を可能とするミドリムシ接着剤

6 今後の課題

記事のご感想をお願いいたします アンケートはこちらから