Ministry of the Environment
Nano Cellulose Promotion

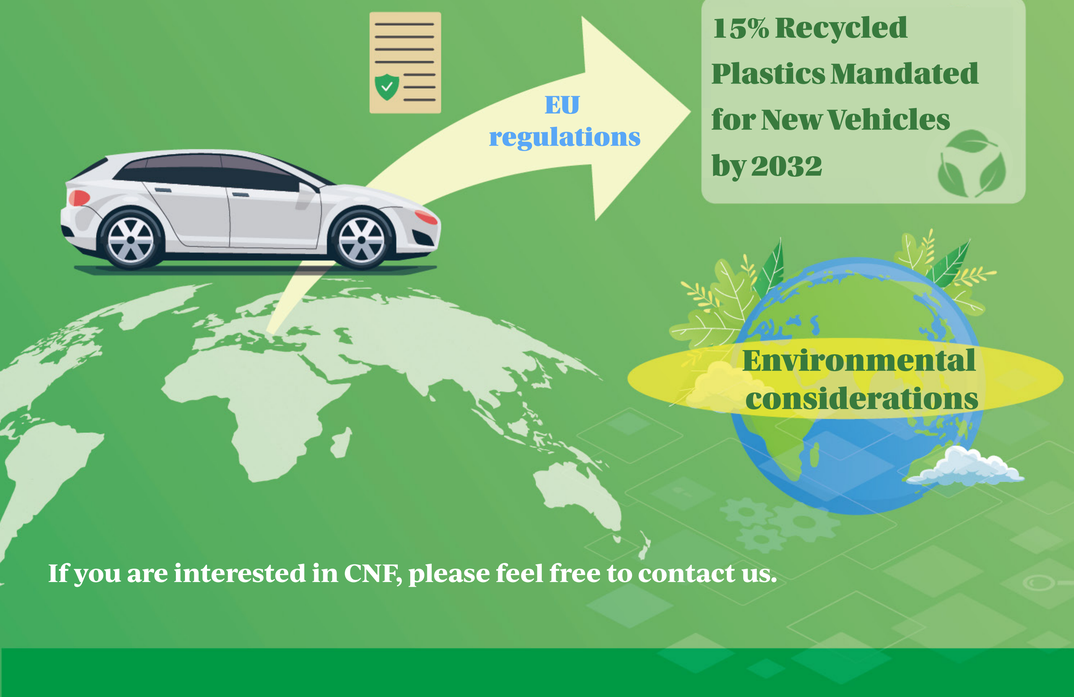
環境省
Ministry of the Environment

CNF & recycled plastics compliant with ELV regulations for new vehicles

By 2032, the proposed ELV regulation will require 15% of the plastics used in new vehicles to contain recycled content. We address challenges such as “reduced strength” and “performance variability” of recycled plastics by using CNF. Here, we introduce solutions in which CNF dramatically improves the performance of recycled plastics, enabling both compliance with environmental regulations and high product performance.

Challenges of recycled plastics

The ELV regulation, which mandates the use of 15% recycled materials in plastics for new vehicles by 2032, is a major challenge for automobile manufacturers. However, recycled plastics face issues such as reduced strength and increased performance variability with each recycling cycle.
We solve these problems and present a pathway to meet strict regulations.



If you are interested in CNF, please feel free to contact us.

Solutions to comply with ELV regulations

Interior parts for new vehicles

Recycled plastics + CNF = Significant improvement in recycled plastic performance

By adding only a small amount of CNF, the performance of recycled plastics is dramatically improved. With a 10% CNF addition, stiffness and strength can be increased by 1.5 times.This enables stable quality while achieving both environmental compliance and product performance.We demonstrate that CNF-reinforced plastics can be recycled repeatedly and support sustainable manufacturing.

With 10% CNF addition: 1.5× stiffness, 1.5× strength

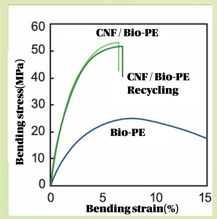
Pallet material	Flexural modulus (MPa)	Flexural strength (MPa)	Fracture strain (%)	Charpy impact strength (kJ/m2)	MFR (g/10min)
Recycled PP	913 (9)	25.6 (0.1)	-	59 (0.9)	-
CNF2%/RePP	1040 (12)	28.7 (0.1)	-	12 (0.5)	-
CNF5%/RePP	1378 (11)	35.2 (0.2)	-	8.4 (0.3)	3.8
CNF10%/RePP	1500 (17)	37.9 (0.1)	-	5.3 (0.4)	7.3

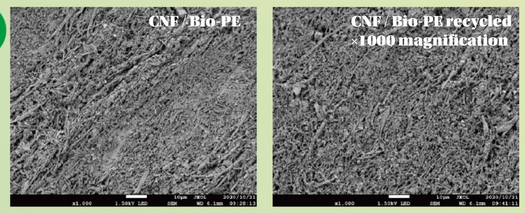
Automotive interior material	Flexural modulus (MPa)	Flexural strength (MPa)	Fracture strain (%)	Charpy impact strength (kJ/m2)	MFR (g/10min)
Recycled PP	1220 (35)	35.3 (0.30)	-	5.97 (0.29)	35
CNF2%/RePP	1518 (26)	39.8 (0.54)	-	4.28 (0.06)	24
CNF5%/RePP	1882 (37)	45.5 (0.25)	-	3.18 (0.42)	13
CNF10%/RePP	2687 (7)	58.6 (0.04)	6.90 (0.07)	2.40 (0.06)	4.6

NEDO / CNF Human Resource Development Program – Related Research 2022

Molding ➡ pulverization ➡ remolding ♻ Recyclable

TOYOTA BOSHOKU CORPORATION





Ministry of the Environment, Environmental Research and Technology Development Fund
Acetylated CNF-reinforced Bio-PE Project 2019-2020