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Preparation of β -cyclodextrin reinforced waterborne polyurethane nanocomposites with excellent mechanical and self-healing property

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1 Preparation of β -cyclodextrin reinforced waterborne polyurethane
2 nanocomposites with excellent mechanical and self-healing property

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9 **Abstract**

10 Cyclodextrin is an eco-friendly material with extensive application range. In this
11 work, polyethylene glycol (PEG) modified β -cyclodextrin (CD) was added to a
12 self-healing waterborne polyurethane (SHWPU) through a simple solution blending
13 method. The morphologies, chemical structures, emulsion stability, thermal behavior,
14 mechanical and self-healing properties of the SHWPU/CD nanocomposites were
15 investigated. The results indicated that CDs were well dispersed in the SHWPU
16 matrix and the blended emulsions were stable. The thermal stability of the SHWPU
17 was improved by the addition of CD. When the mass fraction of CD was lower than
18 5%, the mechanical and self-healing property of the nanocomposites were obviously
19 improved, which indicates the CD modified SHWPU can find potential applications
20 in durable coatings and adhesives in areas, such as textile, wood, aerospace and
21 infrastructure.

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