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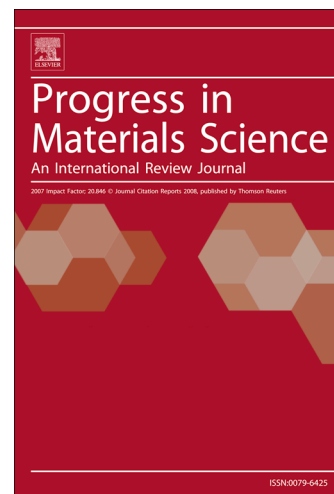
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A review on synthesis, characterization and potential applications

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PII: S0079-6425(18)30054-9
DOI: <https://doi.org/10.1016/j.pmatsci.2018.05.001>
Reference: JPMS 515

To appear in: *Progress in Materials Science*

Received Date: 29 December 2017
Accepted Date: 14 May 2018



Please cite this article as: Joshi, M., Adak, B., Butola, B.S., Polyurethane nanocomposite based gas barrier films, membranes and coatings: A review on synthesis, characterization and potential applications, *Progress in Materials Science* (2018), doi: <https://doi.org/10.1016/j.pmatsci.2018.05.001>

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**Polyurethane nanocomposite based gas barrier films, membranes and coatings: A review
on synthesis, characterization and potential applications**

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Abstract

Polyurethane (PU) and its nanocomposites based gas barrier films and coatings have established a distinctive position among various technologically important materials due to their large-scale potential applications. This review aims at highlighting the gas barrier property of polyurethane nanocomposite (PUNC) based films, membranes and coatings containing platelet-shaped fillers such as clays and graphene in PU matrix. The other fillers such as CNT, POSS, metal nanoparticles and nanocellulose have also been reviewed for their contribution in improving gas barrier property of polymers. The probable transport-mechanism of small gas molecules through PU and PUNCs have been discussed. There is also a discussion on basic PU-chemistry and effect of structure and morphology of PU on its gas barrier property. Various factors which influence the gas permeability through PU and PUNC films and coatings have been scrutinized. Some aspects of improving the gas barrier property of PUNCs have also been discussed. An emphasis is given on various proposed models for prediction of gas permeability through polymer nanocomposites. It also reviews the existing literature related to modeling and prediction of gas permeability of different PUNC membranes, films and coatings. Finally, special attention has been paid to the potential industrial applications of PUNC based films and coatings.

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