

# Design and Characterization of Double Dynamic Chemical Networks

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Double Dynamic Networks (DDNs) are polymer networks that combine at least two distinct dynamic modes. In the presented work, dynamic covalent bonds are introduced in such DDNs. These dynamic bonds allow exchanging the radicals they linked without decreasing the overall connectivity of the network. As a result, a network that incorporates these kind of dynamic bonds has always the same amount of cross-links. This gives the material properties like malleability, reprocessability and self-healing ability, while simultaneously maintaining the networks integrity and toughness. An innovative Interpenetrating Double Network (IPDN) is created by the synthesis of two individual functional thermoplastics, which are subsequently cross-linked simultaneously and orthogonally to form a material that contains two different kinds of dynamic cross-links.

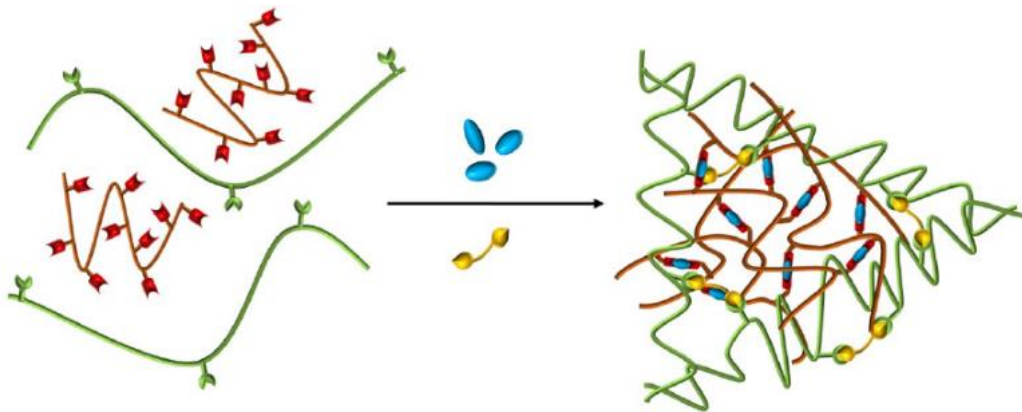


Figure: Interpenetrating double network created out of two individual functional thermoplastics that are cross-linked orthogonally by dynamic covalent cross-linkers.