Turning waste into fuel

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Recovering chemicals from plastic waste is not new. Hydrocracking, which is often used in refining oil to make jet fuel and diesel, can convert plastic too. This reacts a feedstock with hydrogen and a catalyst. However, using the approach with plastic has been hampered by a lack of efficient catalysts. Researchers investigated the use of ruthenium nanoparticles on zeolite supports as a catalyst. They discovered this catalyst efficiently transforms polyethylene, polypropene and polystyrene into methane that could be fed into natural gas networks.
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1. Describe how this process could benefit the environment.
2. Describe why cracking is used in refining crude oil.
3. Suggest why the ruthenium catalyst is put on a zeolite support.