

GCSE Chemistry B (Twenty First Century Science)

J258/03 Breadth in chemistry (Higher Tier)

Question Set 6

1 Nanoparticles of cerium oxide, CeO_2 , are added to diesel fuel.

They act as a catalyst for the combustion of the fuel.

(a) Describe a property of nanoparticles that makes them good catalysts. [1]

(b) The addition of nanoparticles allows more complete combustion of the fuel.

Kai talks about nanoparticles in diesel fuel.

Using nanoparticles in diesel fuel benefits people's health.



Evaluate Kai's statement.

In your answer give arguments **for** and **against** the use of nanoparticles. [3]

(c) CeO_2 contains O^{2-} ions.

Explain how the formula shows that Ce is present as Ce^{4+} ions. [1]

(d) A nanoparticle has a volume of $8 \times 10^{-27} \text{ m}^3$.

A molecule has a volume of $4 \times 10^{-30} \text{ m}^3$.

Estimate how many **moles** of this molecule there are in the nanoparticle.

Number of moles = mol [3]

Total Marks for Question Set 6 : 8

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