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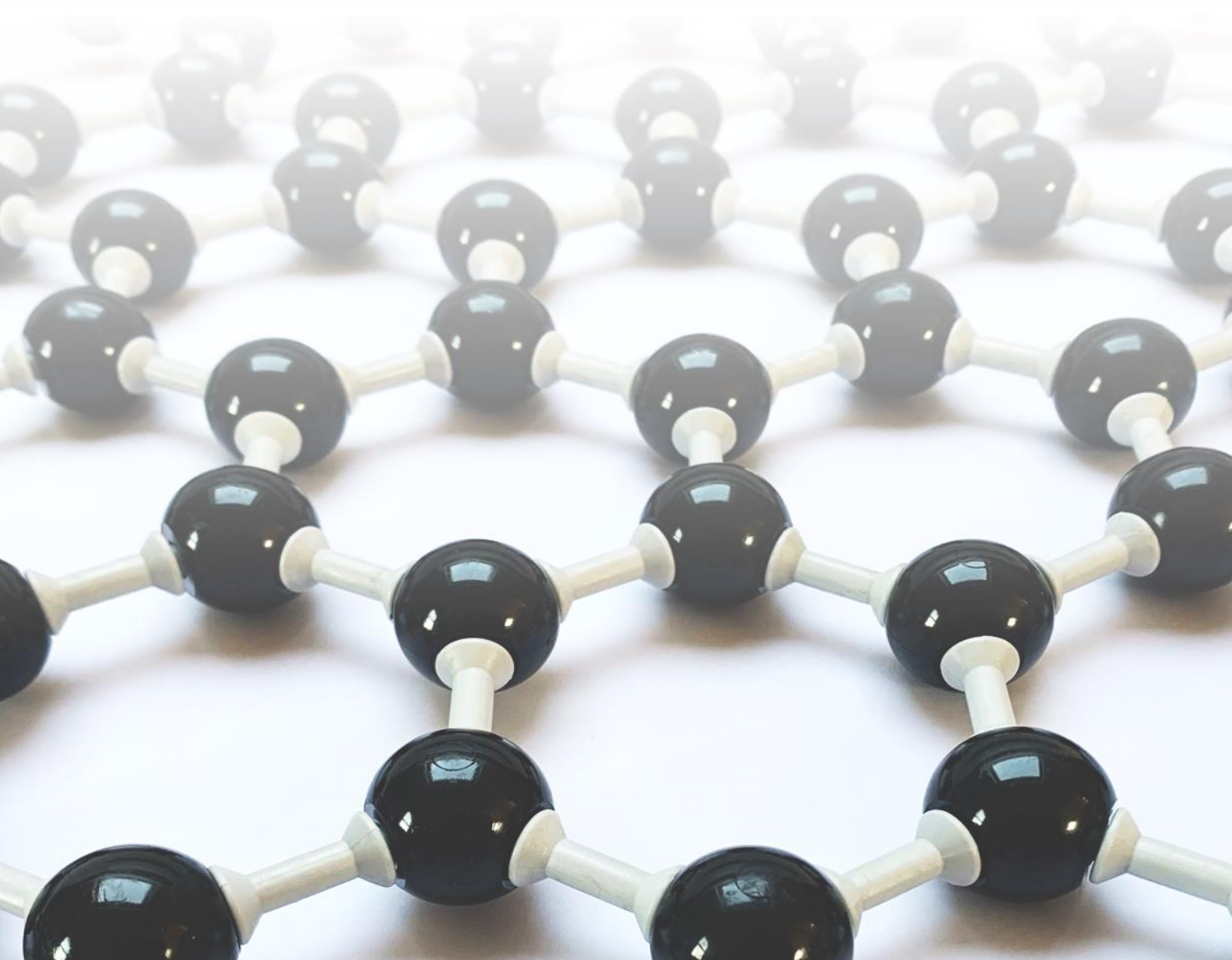

"Global leader for independent reporting on graphene and 2D materials"

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Summary

Batteries feature several times in this issue of the journal. Dear Reader, you will know that energy density is the key performance metric we watch. The higher the energy density (Wh/kg) the further you can travel on a battery charge. Current lithium-ion (Li-ion) batteries have an energy density around 260Wh/kg.

We have highlighted the work of a company developing lithium-sulphur technology (Li-S) vol 5 iss 12 p.35. They have claimed energy densities over three times that of current Li-ion batteries using graphene enhanced cell designs. You will probably guess that we have been following this company and contacted them multiple times. We have yet to see data to back up these extraordinary claims.

It was with interest that we found an online discussion between battery experts, the consensus view is that Li-S technology can create higher energy densities than Li-ion. However, this comes at a cost of reduced battery life. Perhaps this is the reason we have yet to see data backing up the claims for Li-S technology.

Then NASA announced they have been working on a new graphene enhanced battery technology. The graphene is used as the structure for a sulphur/selenium cathode and is based on holey graphene that NASA developed in 2017. A solid-state electrolyte separates the anode from a lithium metal anode. The interim results are promising. They have achieved an energy density of 500Wh/kg. The battery seems to be safer too. It resists impact damage and has a maximum operating temperature of 150°C. NASA anticipates this solid-state battery will start to become available within three to five years.

Elsewhere in this issue we report on developments as diverse as graphene enhanced condoms in India to graphene enhanced polymers launched on a SpaceX rocket bound for the moon. There is so much more in between these two very different applications, I encourage you to read on…

Adrian Nixon

1st January 2023

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