Slides of 3D images from the RSC Lecture

"Watts New with Clean Energy? Batteries Included"

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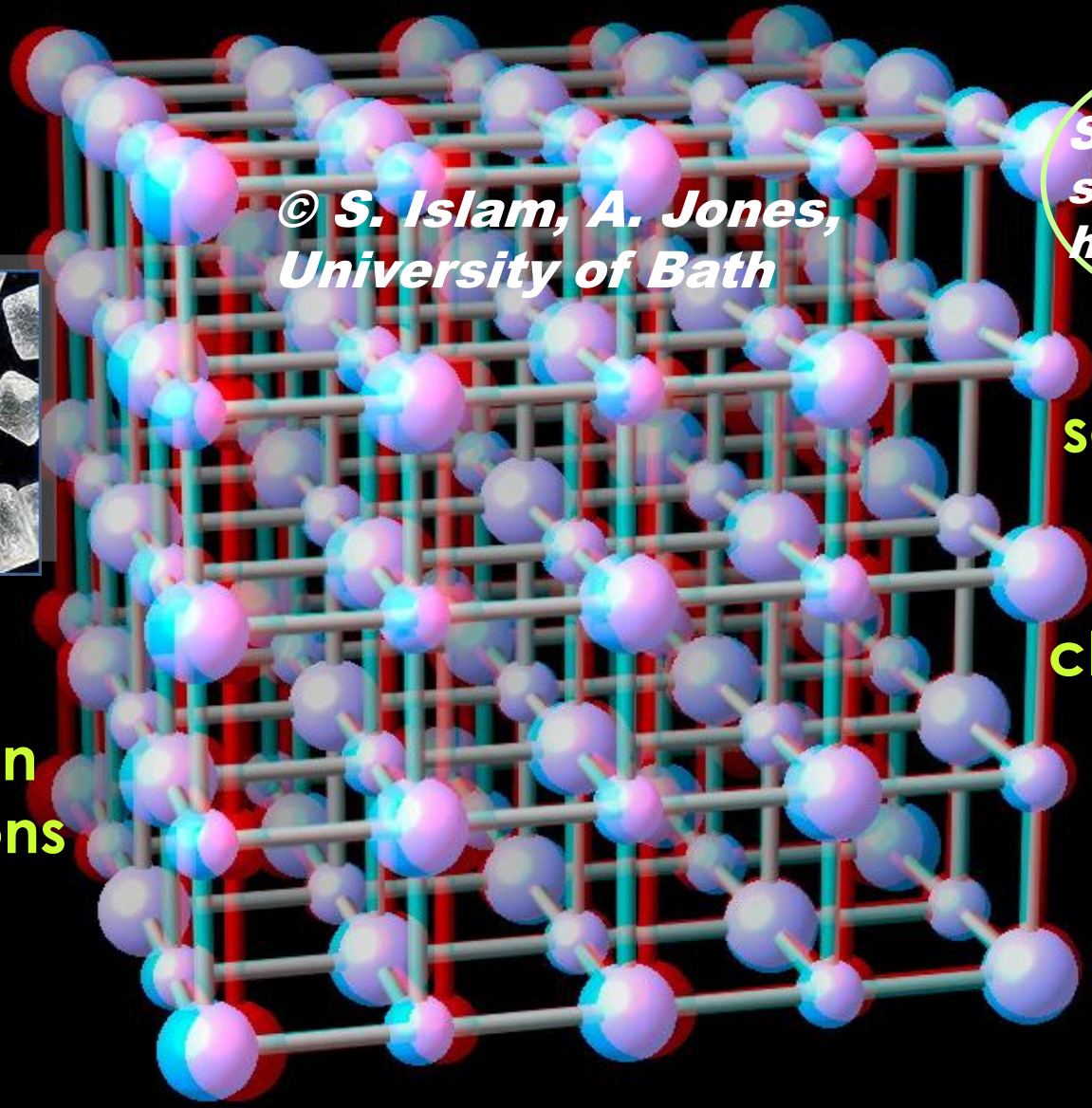
Sodium Chloride

Crystal clear?

Ionic bonding in all directions



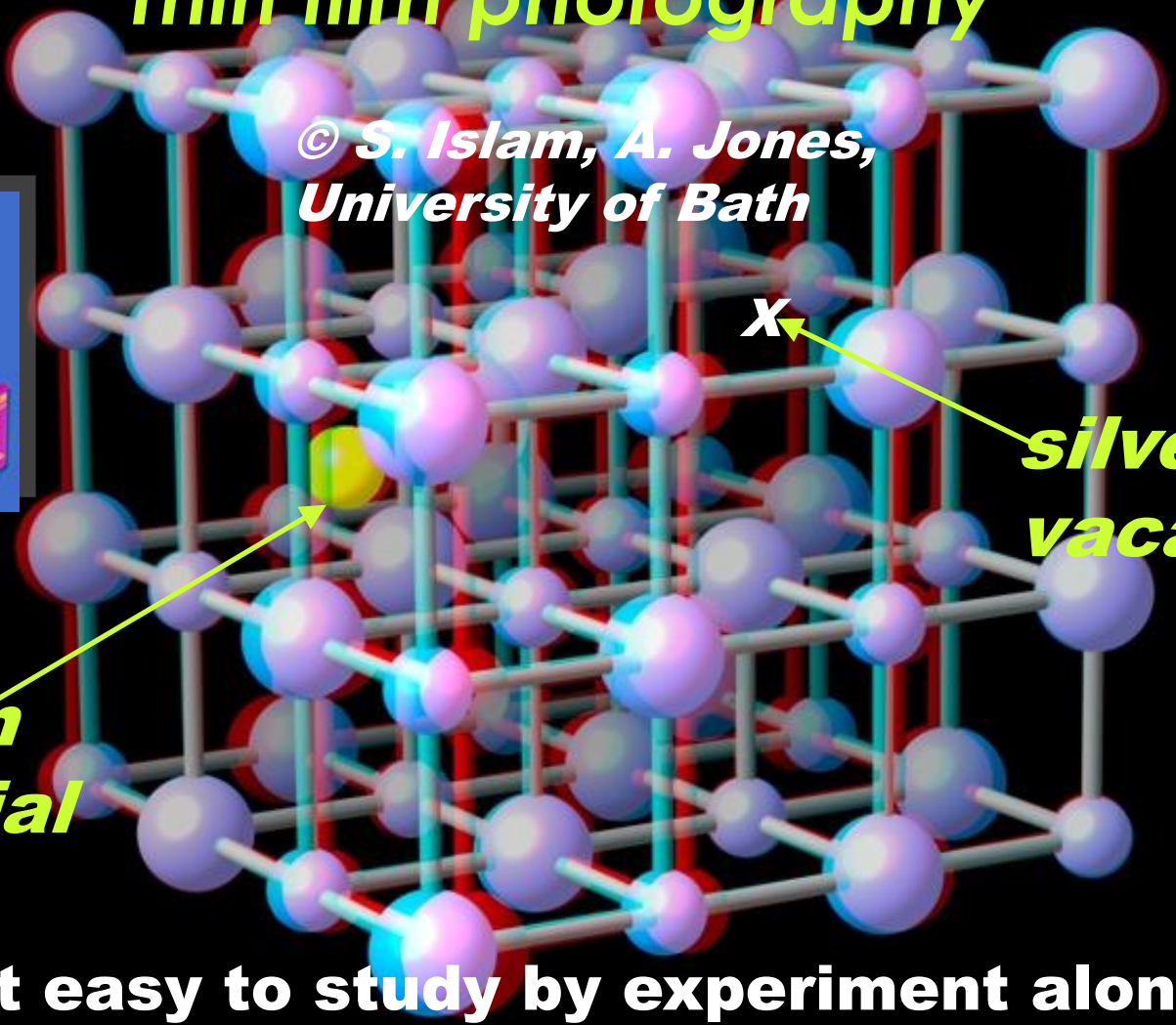
Specs & stare & move head

sodium ion (small)

chloride ion (large)

Defects in silver chloride, AgCl

Thin film photography

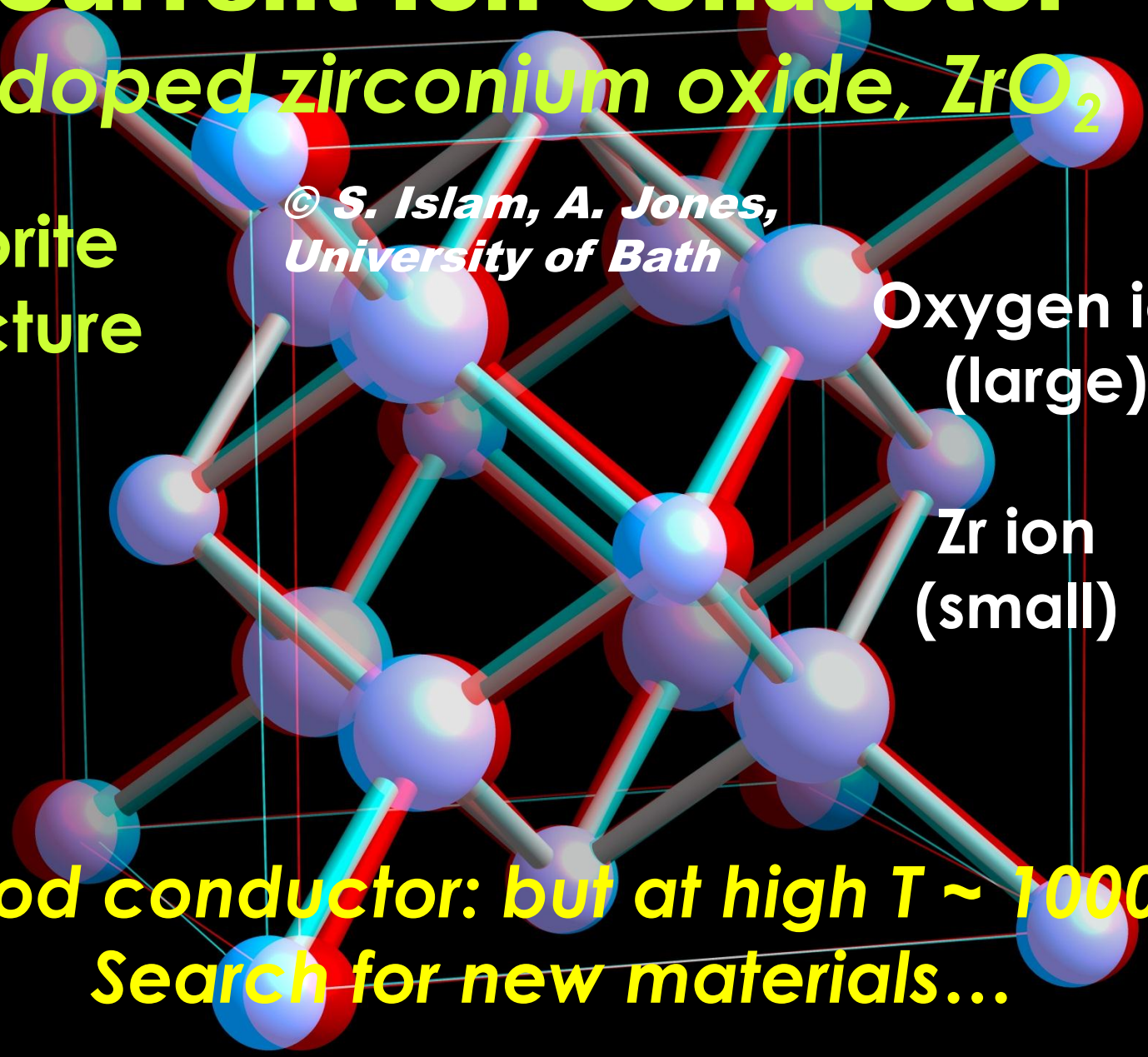


Not easy to study by experiment alone

Pointer

Current Ion Conductor

Y-doped zirconium oxide, ZrO_2



Fluorite structure

Oxygen ion (large)

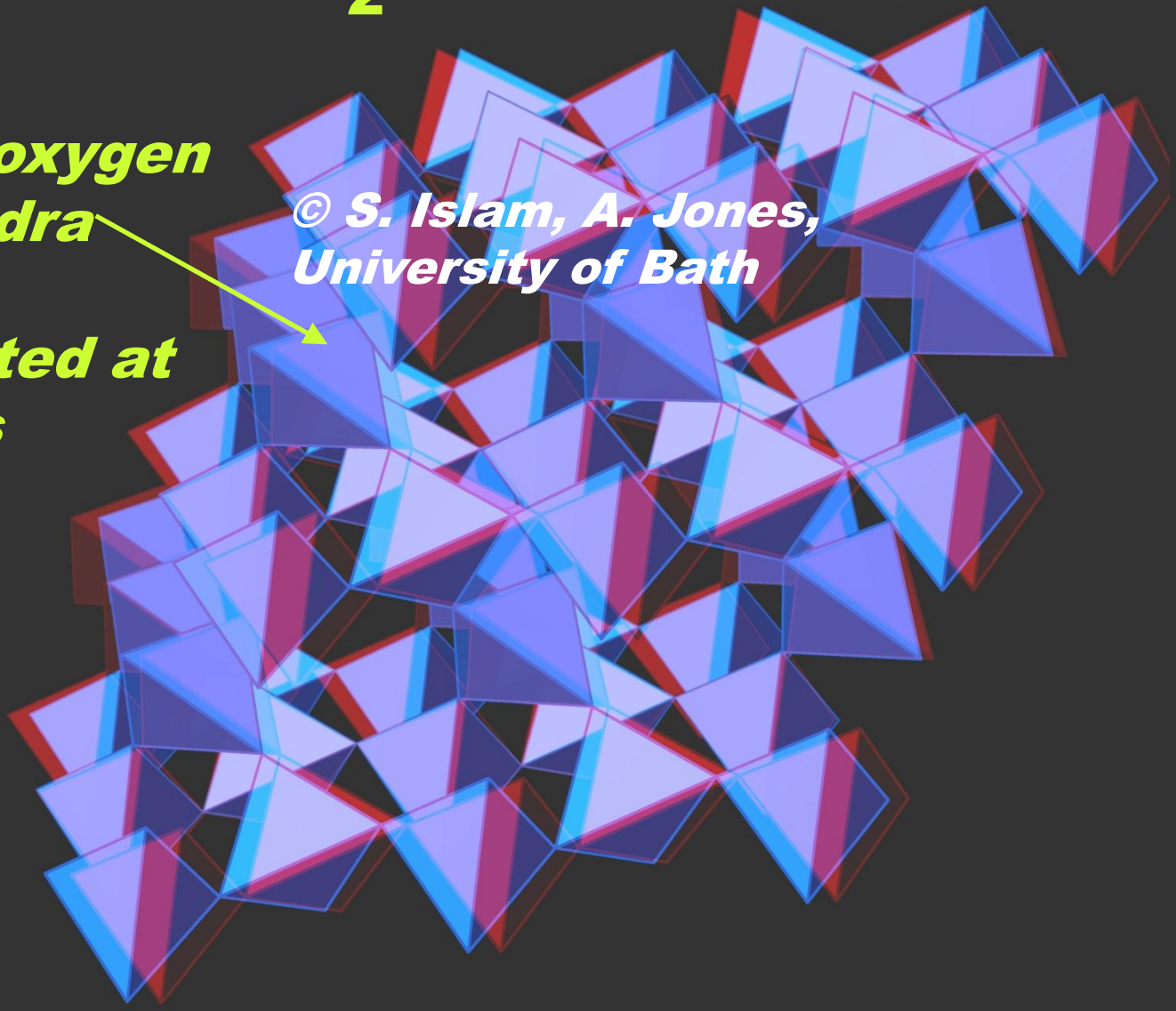
Zr ion (small)

Good conductor: but at high T ~ 1000C
Search for new materials…

Silica SiO_2 : Sand & Quartz

silicon-oxygen tetrahedra

connected at corners



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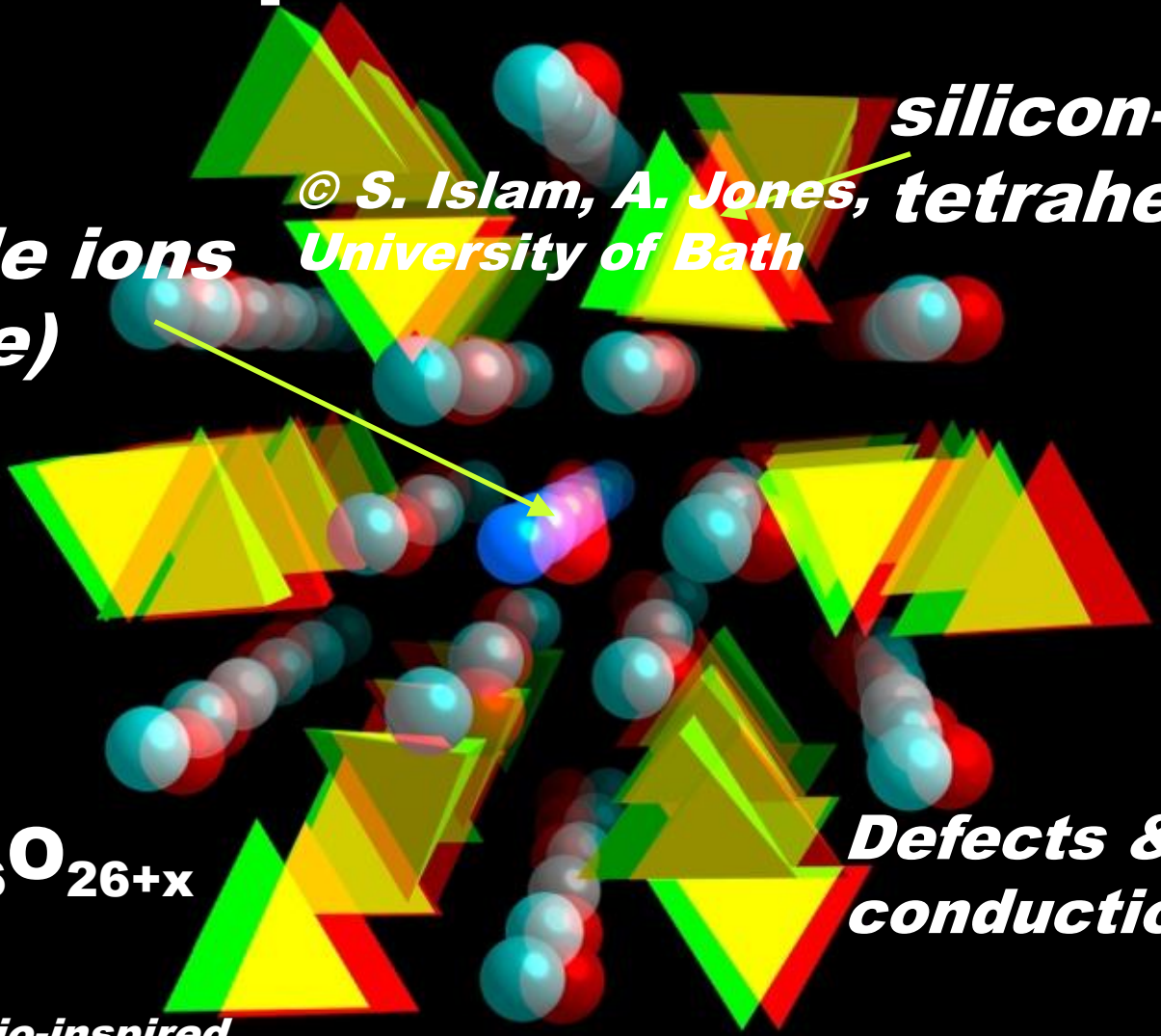
Apatite Silicate



silicon-oxygen tetrahedra

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oxide ions (blue)

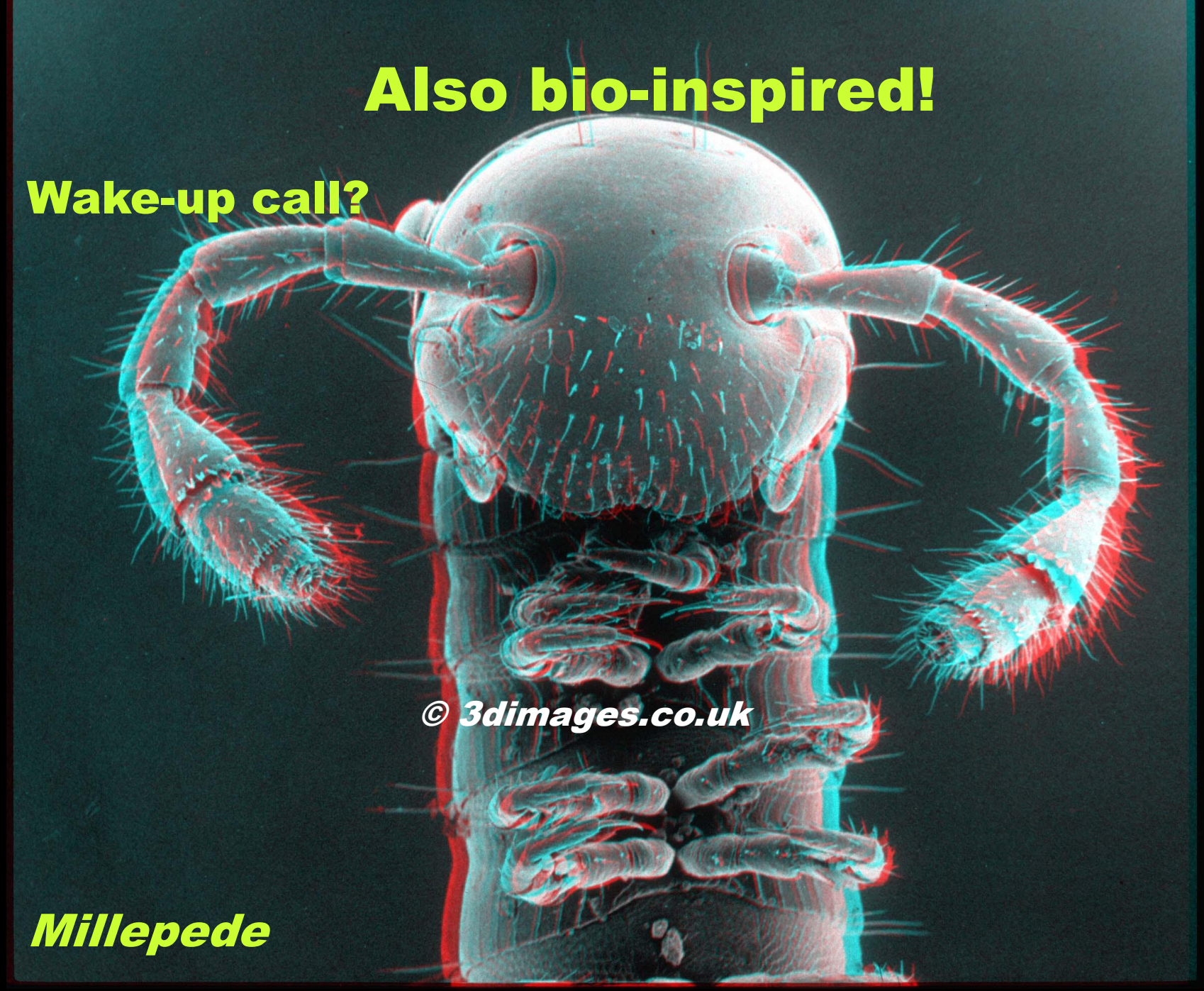
$La_{10}Si_6O_{26+x}$

Defects & conduction path?

Next...also bio-inspired

Also bio-inspired!

Wake-up call?

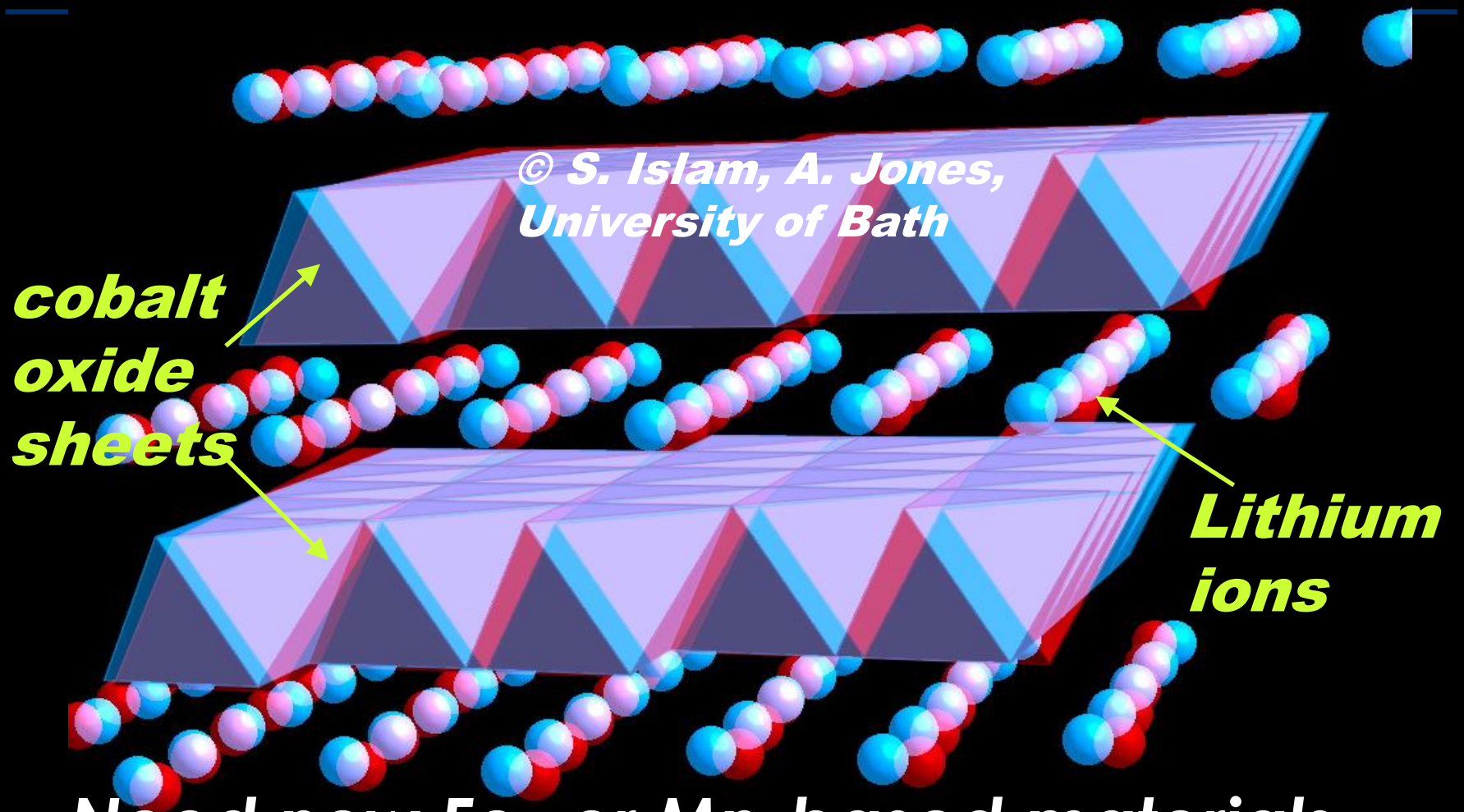


Millepede

Hybrid Test Car in Glasgow

Supergen (EPSRC)
Energy Storage
Consortium

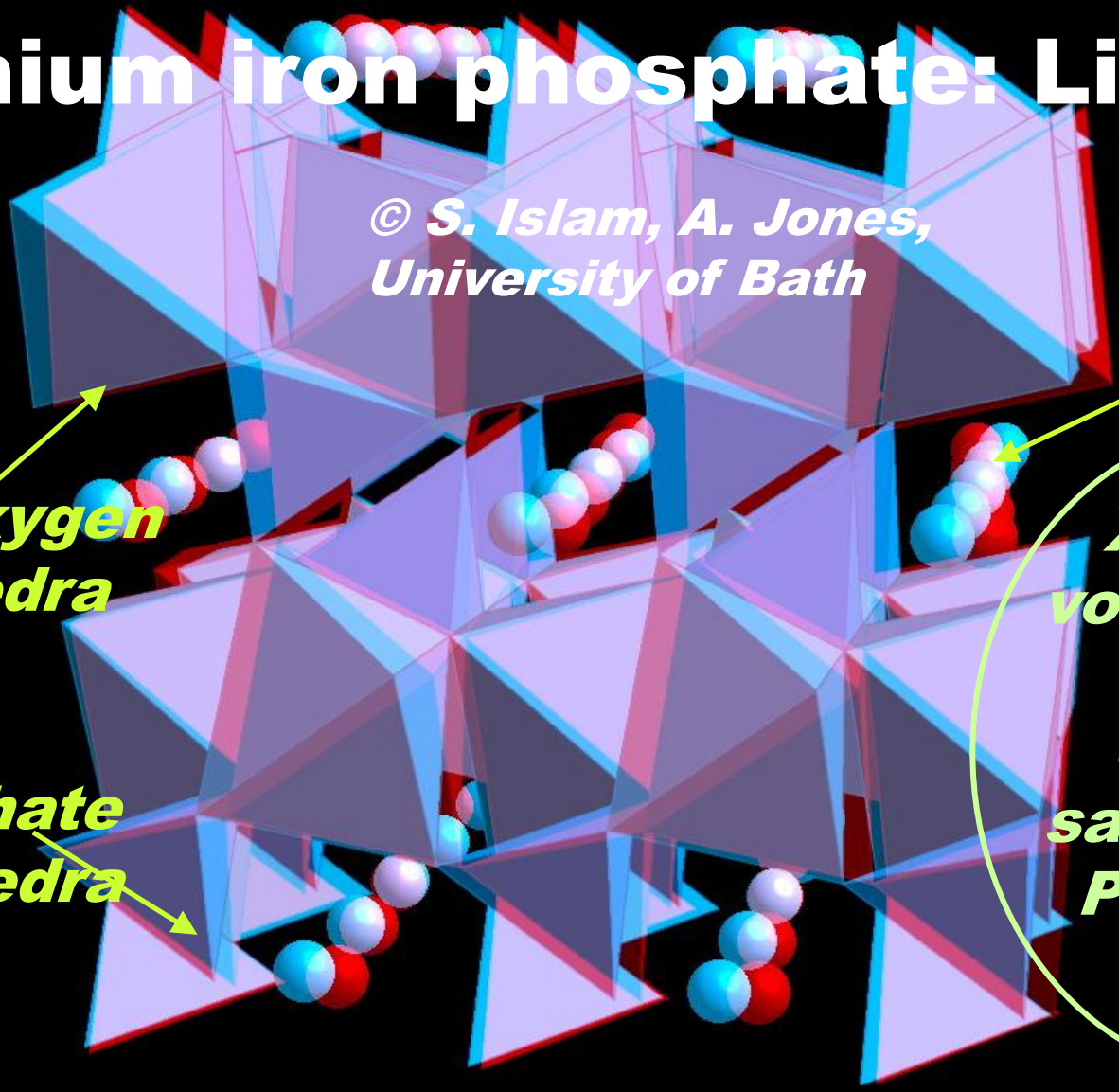
Current electrode: $LiCoO_2$



Need new Fe- or Mn-based materials

Watts New?

Lithium iron phosphate: $LiFePO_4$



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Lithium ions

Iron-oxygen octahedra

Phosphate tetrahedra

X-Factor: voltage, non-toxic, cheaper, safer (strong P-O bonds)


Not many people know this..
Sonic screw driver: lithium battery powered?
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