Advanced Particle Separation for Environmental Protection

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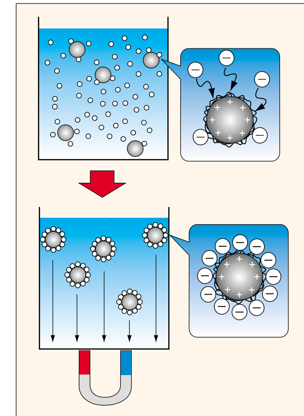
Particle separation technology is of great importance for recycling and wastewater treatment. The Particle Separation Group has recently developed a pneumatic column separator and a magnetic solid flocculant. The former separates particles depending on their density and is applicable to the separation of waste metals, plastics and glasses from various industrial and municipal wastes. The latter can flocculate suspended solids in wastewater without adding inorganic or organic flocculants. Magnetic force promotes the settling of floccules. The solid flocculant is recovered by re-dispersing the floccules through pH control and can be used repeatedly.



Removal of fine particles using magnetic solid flocculant

Energy Science & Technology

A great Success of Interface Controlled Enhancement type Buried-Channel 4H-SiC Metal-Oxide-Semiconductor Field Effect Transistor (ICE-BC MOSFET) with the Best Electrical Performance in the World

– Establishment of Channel Mobility of $140cm^2/Vs$ –

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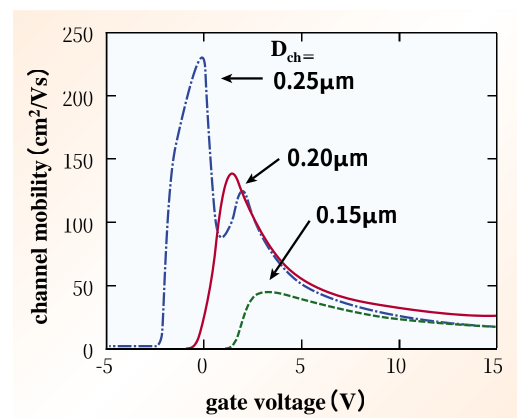
We have fabricated buried channel MOSFETs with a thermally grown gate oxide in 4H-SiC. The gate oxide was prepared by dry oxidation with H_2O annealing. The buried channel region was formed by nitrogen ion implantation at room temperature followed by annealing at 1500 °C. The optimum doping depth of the buried channel region has been investigated. For the nitrogen concentration of 1×10^{17} cm^{-3}, the optimum depth was found to be 0.2μm. Under this condition, the channel mobility of 140 cm^2/Vs was achieved with the threshold voltage of 0.3 V. This channel mobility is the highest reported so far for a enhancement type 4H-SiC MOSFET with a thermally grown gate oxide.



Gate voltage dependence of channel mobility for ICE-BC MOSFET