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GravityGuard™ – The Advanced Paste Additive to Enter the New Era of Lead Acid Batteries

M. Robotti, S. Barnes, E. Gao, T. Wojcinski, G. Beckley, P. Nikolov (Bulgarian Academy of Sciences)

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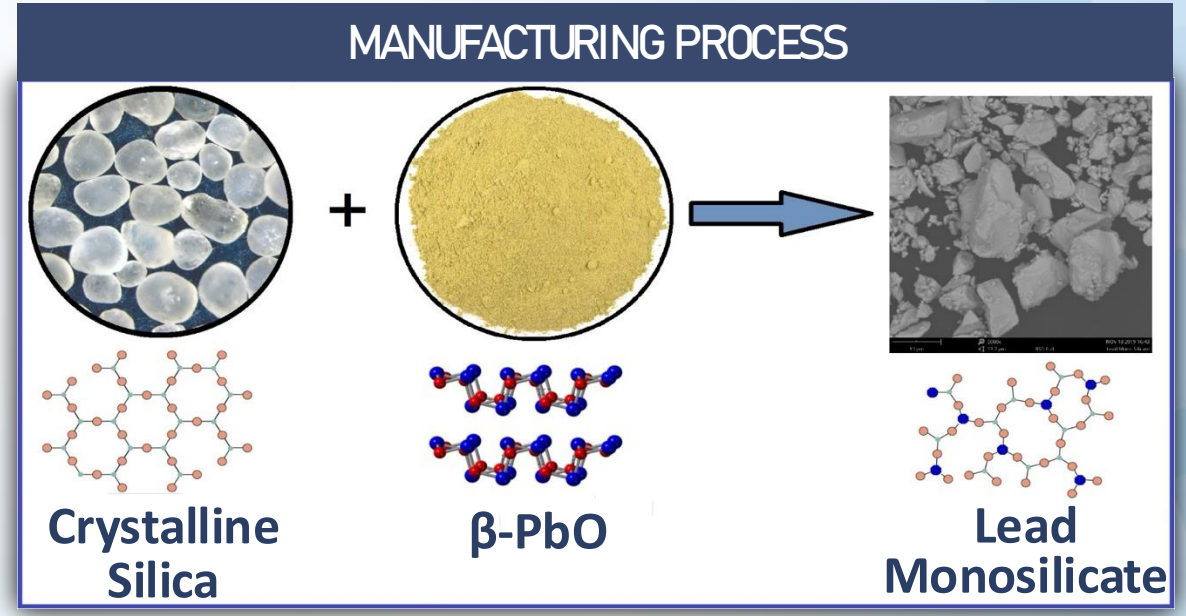
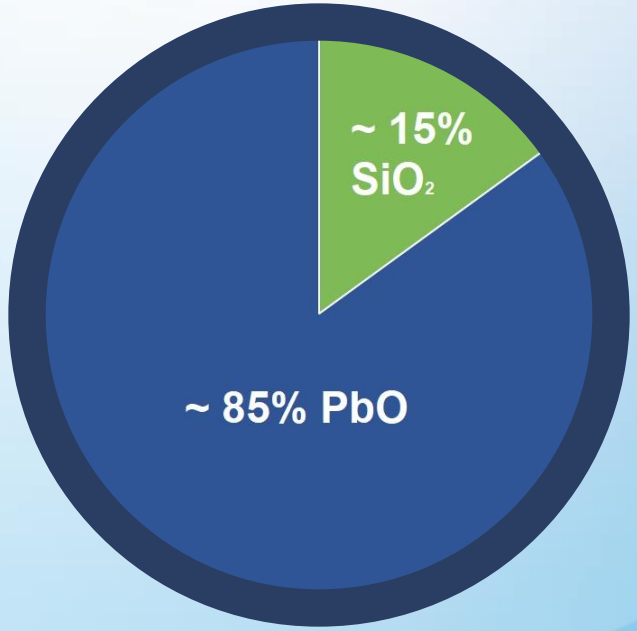
Material Composition

- GravityGuard™ is an amorphous glassy material consisting of about ~ 15% Silica (SiO_2) with the remainder as β-PbO (PbO ~ 85%).
- Key material characteristics include a high composition of PbO relative to SiO_2, a density similar to that of lead oxide, and low levels of harmful impurities.
- Insertion of Si into the PbO structure leads to acid-absorbing properties (creation of gel micro-sponges) of the active materials.
- Porosity enhancement and acid-absorbing properties of GravityGuard™ improve battery performance and cycle life.





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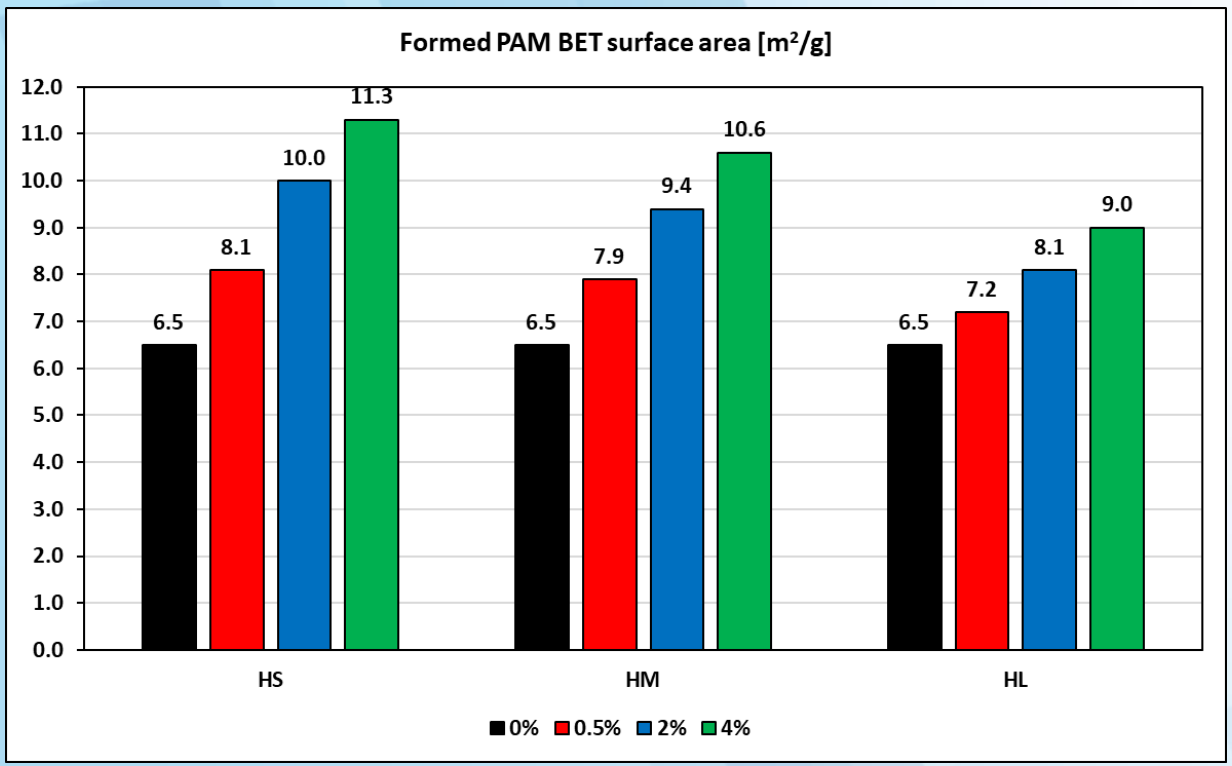
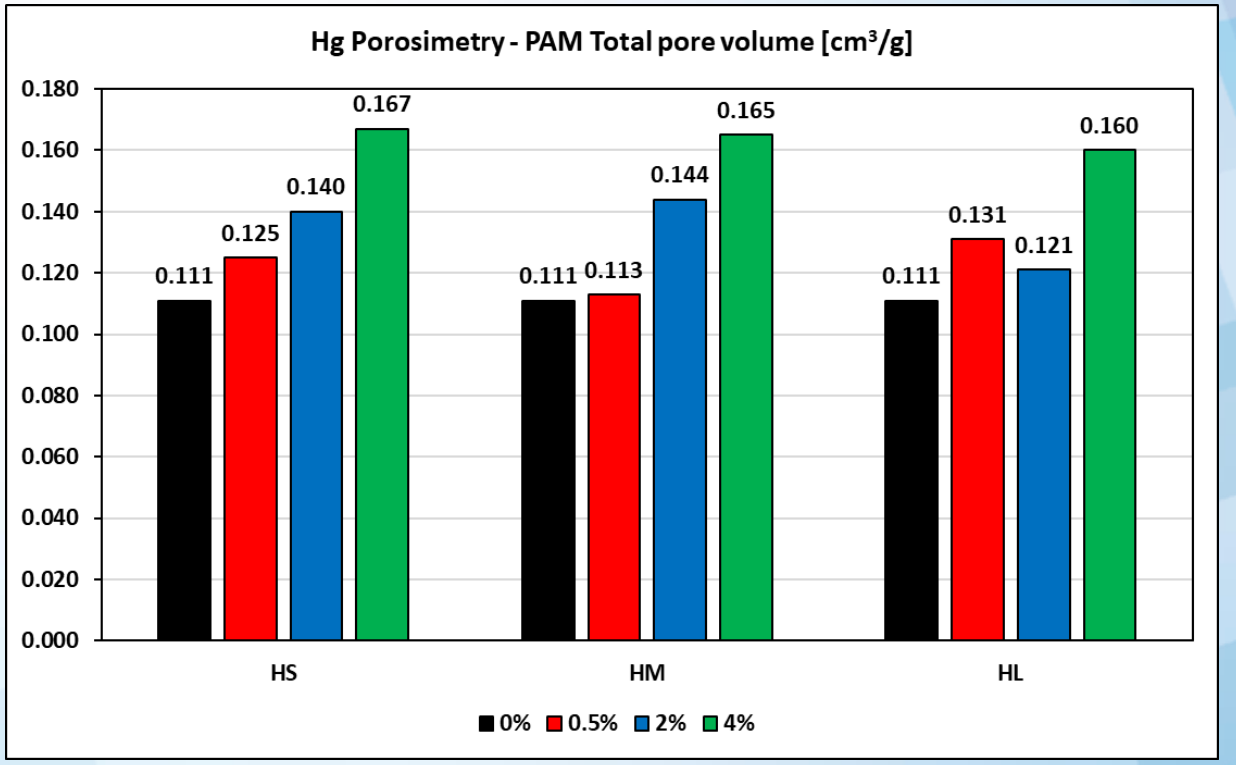
GRAVITYGUARD™ in Positive Active Material (PAM) – Effects on BET and Porosity





GG increases formed PAM BET surface area, both as a function of particle size (HL<HM<HS) and dosages (0.5<2<4%).

GG significantly increases formed PAM porosity as a function of loading (0.5%<2%<4%).

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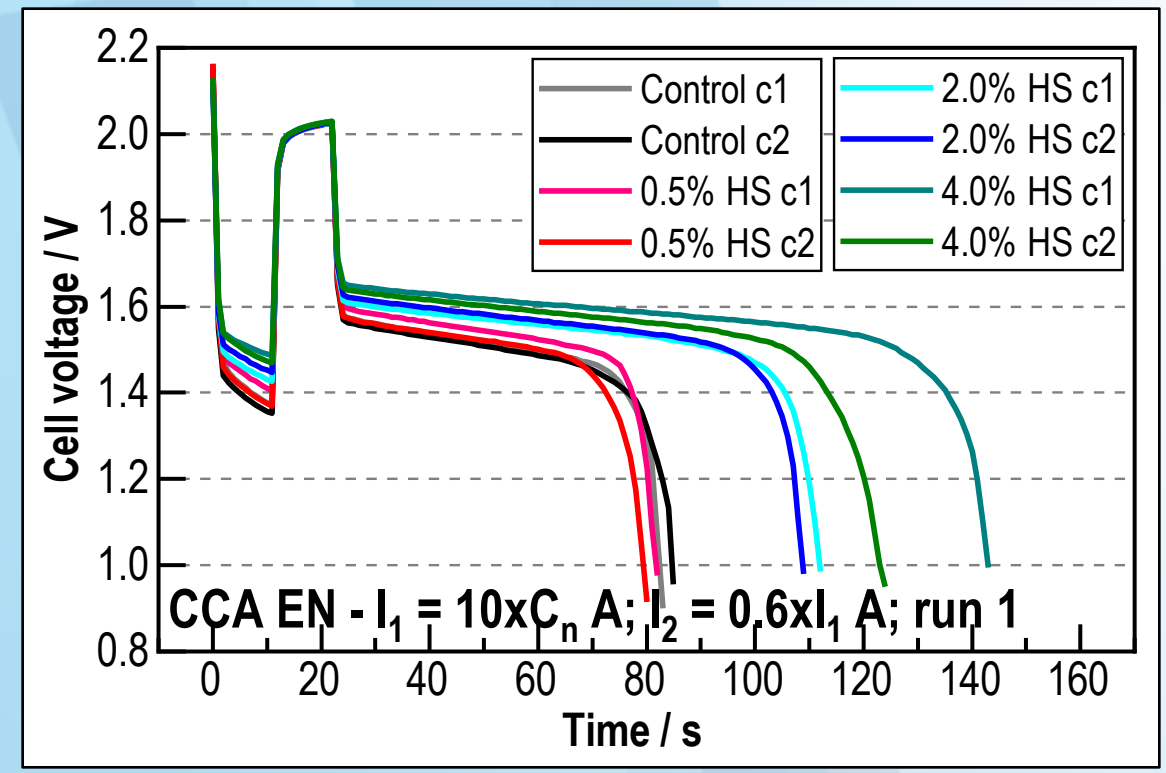
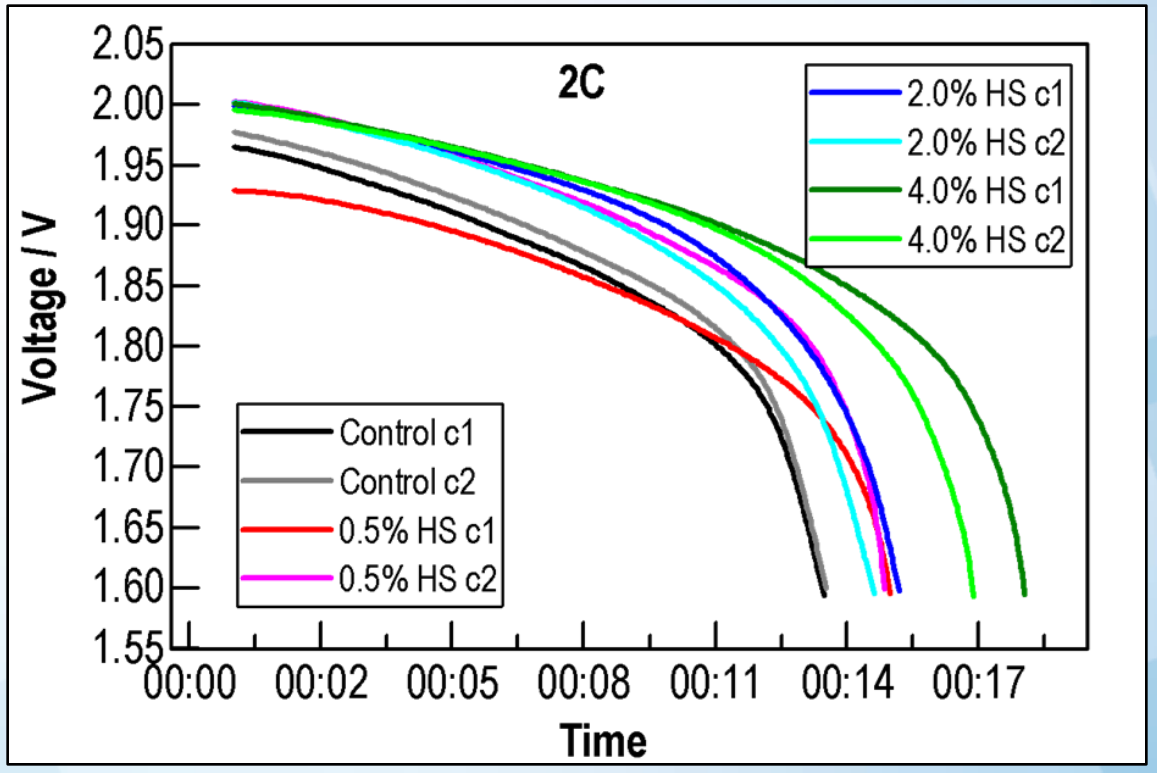
GRAVITYGUARD™ in Positive Active Material (PAM) – Effects on CCA & High-rate discharge





High dosage (2-4%) has a strong influence on cold cranking time and discharge voltages.

Small particle sizes (HS) produced a significant increase of the cold cranking time and have a stronger effect than bigger particles on 2C.

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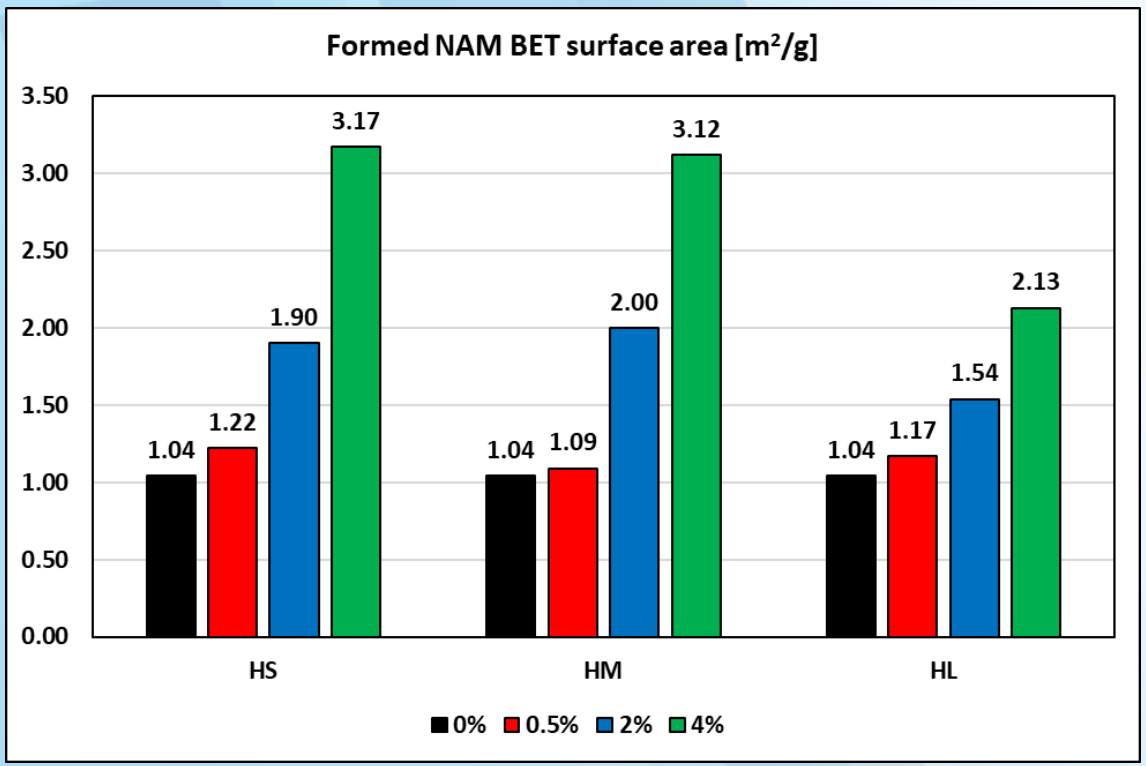
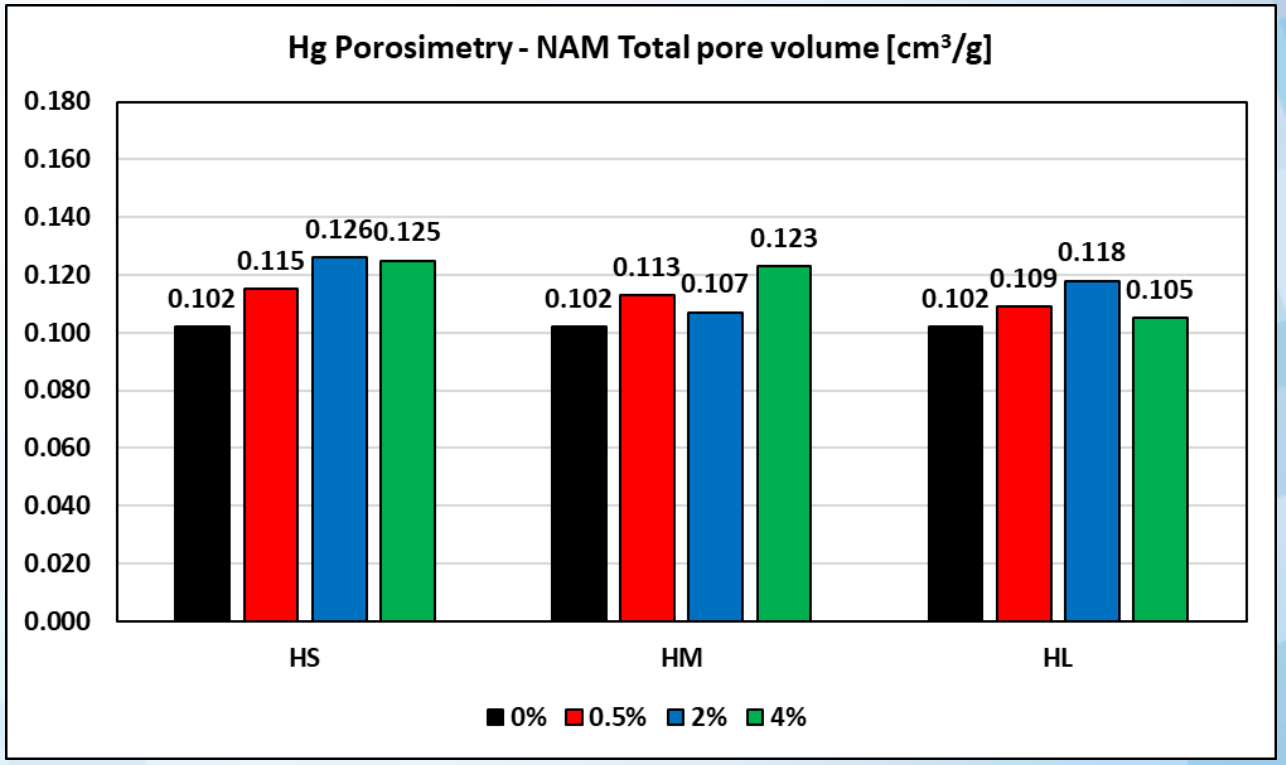
GRAVITYGUARD™ in Negative Active Material (NAM) – Effects on BET and Porosity

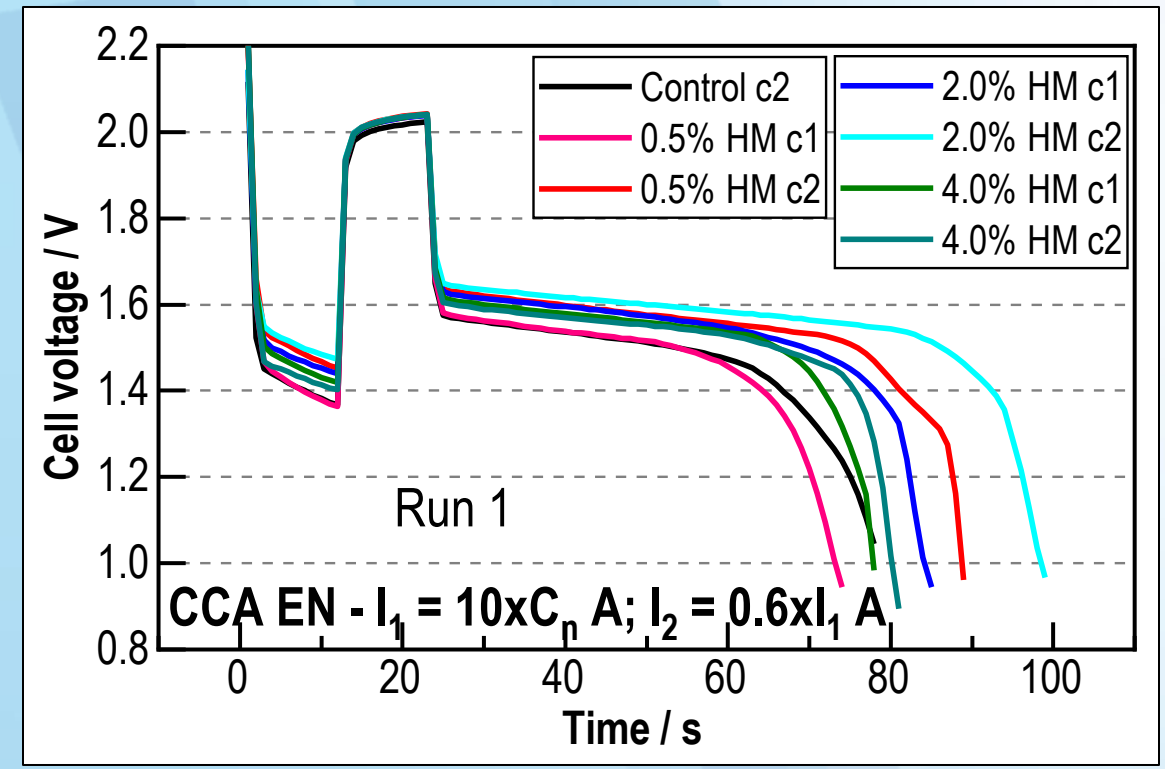


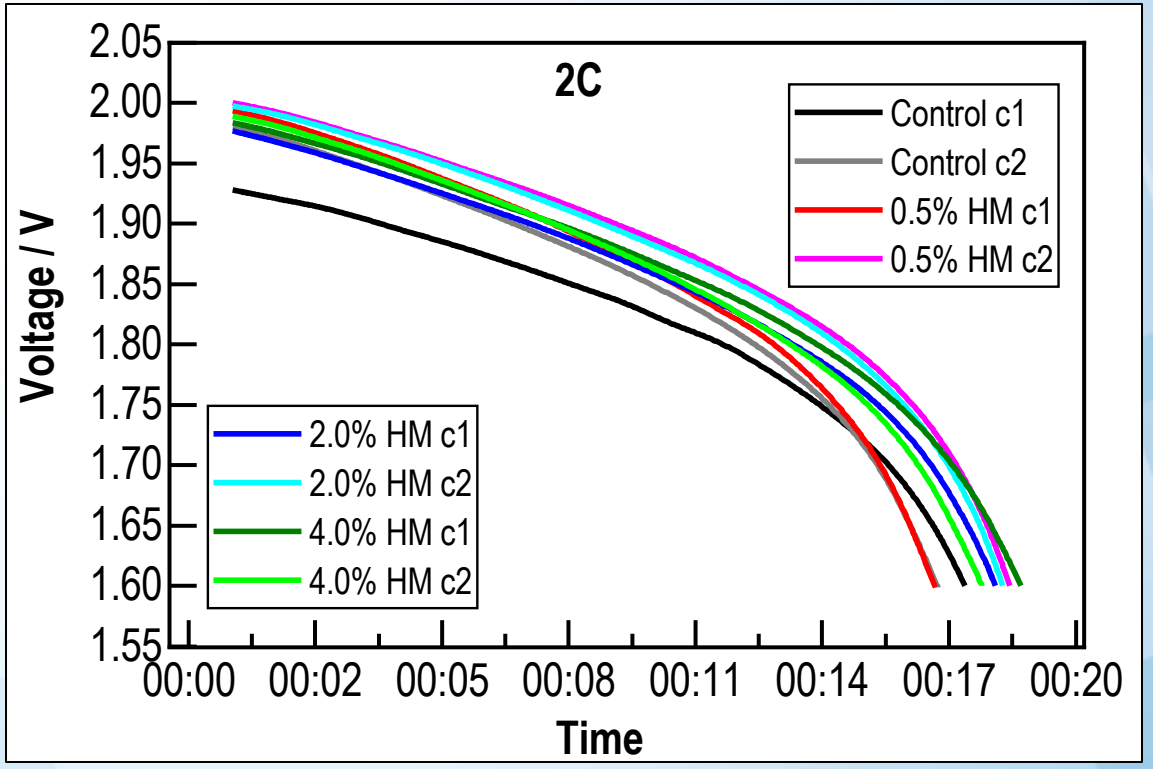


GG increases formed NAM BET surface area, both as a function of particle size (HL<HM<HS) and dosages (0.5<2<4%).

GG increases formed NAM BET porosity. HS particles gave the highest porosity increase.

GRAVITYGUARD™ in Negative Active Material (NAM) – Effects on CCA & High-rate discharge





When added to NAM, GG increases CCA and high-rate discharge (2C) performance.

Conclusions

- SiO_2 is confirmed to be a porosity enhancer material and micro-gel structures inside the active material give performance benefits.
- When added to PAM, GravityGuard™ significantly increases formed PAM BET surface area, PAM porosity, CCA and high-rate discharge (2C) performance.
- When added to NAM, GravityGuard™ increases formed NAM BET surface area and NAM porosity. CCA and high-rate discharge (2C) performance are improved as well.
- GravityGuard™ loading and particle size can be optimised to reach the best performance for each application.

Thank You for Your Attention!
Please Contact Us for Discussion and to Request Samples.

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