

H302 Facultative oligotrophic Gram-negative bacteria as a dominant heterotrophs in high-purity water of semiconductor industry

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Semiconductor device manufacturing lines require stringent deionized water (DI water) quality control. Bacteria as living organism contain metals and are particulate which are detrimental to integrated circuit manufacturing. Because bacteria have been shown to be a major cause of manufacturing problems and process failure, it is crucial to monitor and control the number of bacteria. Effective method for isolation of heterotrophic bacteria from DI water used in semiconductor industry of Samsung Electronics Co. LTD. was developed. Most of bacteria isolated from DI water were Gram-negative. They were classified into three groups based on growth patterns in different concentrations of nutrient agar medium. 82 % of bacteria were facultative oligotrophs which can grow on the 10⁻⁴ diluted nutrient agar medium as well as nutrient agar medium. 2 % of bacteria were obligate oligotrophs which can grow only on the diluted nutrient agar medium, but not on nutrient agar medium. 16 % of bacteria were copiotrophs which can not grow on 10⁻⁴ diluted nutrient agar medium. The physiological characteristics of oligotrophic bacteria were studied.

H303 Identification and nutritional flexibility of oligotrophic and copiotrophic bacteria isolated from high-purity water of semiconductor industry

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Oligotrophic bacteria and copiotrophic bacteria isolated from high-purity water of semiconductor industry were identified using BIOLOG identification system. Of the 45 oligotrophic bacteria, *Xanthomonas maltophila* (8 strains), *X. oryzae* (4 strains), *X. campestris* (1 strain), *Flavobacterium meningosepticum* (6 strains), *Burkholderia pickettii* (3 strains), *B. solanacearum* A (1 strain), *Comamonas acidovorans* (2 strains), *Alcaligenes latus* (1 strain), *Acinetobacter radioresistens* (1 strain), *Kingella kingae* (1 strain), and *K. denitrificans* (1 strain) were identified. Of the 31 copiotrophic bacteria, *B. pickettii* (11 strains), *C. acidovorans* (6 strains), *F. meningosepticum* (3 strains), *X. maltophila* (1 strain), *X. oryzae* (1 strain), *X. campestris* (1 strain), and *Acinetobacter genospecies* 9 (1 strain) were identified. The nutritional flexibility of the bacteria was investigated. The oligotrophic bacteria were shown to be able to utilize a significantly broader range of organic substrates than the copiotrophic bacteria, consistent with the idea that nutritional flexibility is adaptive for oligotrophic bacteria.