

저가격 기판을 이용한 고효율 실리콘 태양전지 개발
Development of High-efficiency Silicon Solar Cells on Low Cost Substrates

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We have fabricated 4 cm² cells on String Ribbon Si wafers with efficiencies of 17.8% using a combination of laboratory and industrial processes. These are the most efficient String Ribbon devices made to date, demonstrating the high quality of the processed silicon and the future potential for industrial String Ribbon cells. Co-firing PECVD (Plasma Enhanced Chemical Vapor Deposition) silicon nitride (SiN_x) and Al by RTP (Rapid Thermal Process) was used to boost the minority carrier lifetime of bulk Si. Photolithography front contacts were used to achieve low shading losses and low contact resistance with a good blue response. The firing temperature and time were studied with respect to the trade-off between hydrogen retention and aluminum back surface field (Al-BSF) formation. Bulk defect hydrogenation and deep Al-BSF formation took place in a very short time (~1 sec) at temperatures higher than 740 oC.