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This investigation was implemented in the framework of a novel all-low thermal budget polysilicon emitter solar cells fabrication technology. A comparative study of structural and electrical properties of thin silicon layers deposited by silane pyrolysis in a classical hot-wall furnace (LPCVD) and a cold-wall RTP reactor (RT-LPCVD) has been made. Deposition conditions and rapid thermal anneals were varied in order to improve the physical properties of RT-LPCVD polysilicon films. The structural properties have been characterized by means of grazing X-ray diffraction and cross-sectional TEM analysis. Sheet resistivity measurements performed on POCl/sub 3/-doped and subsequently rapid thermal annealed films showed the feasibility of low resistivity films particularly when the polysilicon layers are initially deposited in the amorphous state. Finally, RTCVD polysilicon emitter solar cells with various thicknesses were tested by spectral photo-response analysis.

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