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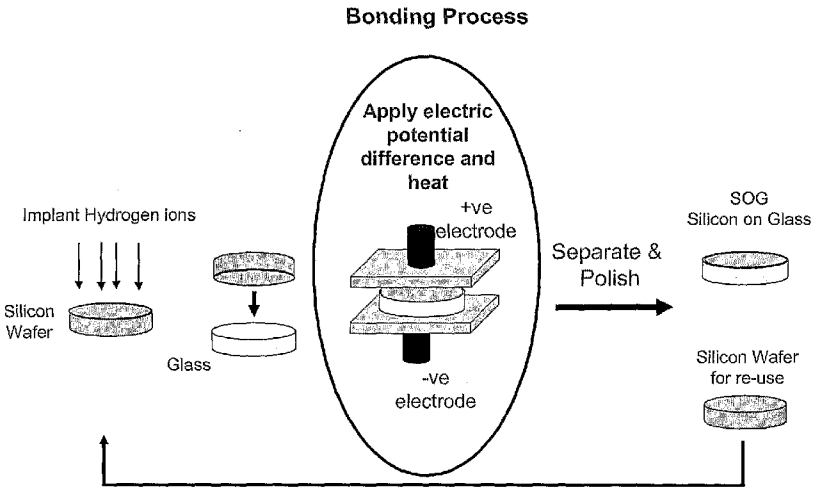
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(54) Title: GLASS-BASED SOI STRUCTURES



(57) Abstract: Semiconductor-on-insulator (SOI) structures, including large area SOI structures, are provided which have one or more regions composed of a layer (15) of a substantially single-crystal semiconductor (e.g., doped silicon) attached to a support substrate (20) composed of an oxide glass or an oxide glass-ceramic. The oxide glass or oxide glass-ceramic is preferably transparent and preferably has a strain point of less than 1000°C, a resistivity at 250°C that is less than or equal to 1016 -cm, and contains positive ions (e.g., alkali or alkaline-earth ions) which can move within the glass or glass-ceramic in response to an electric field at elevated temperatures (e.g., 300-1000°C). The bond strength between the semiconductor layer (15) and the support substrate (20) is preferably at least 8 joules/meter2. The semiconductor layer (15) can include a hybrid region (16) in which the semiconductor material has reacted with oxygen ions originating from the glass or glass-ceramic. The support substrate (20) preferably includes a depletion region (23) which has a reduced concentration of the mobile positive ions.

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