of defects because of the very fast heating and cooling cycles and possibly also due to precluded gettering action [88].

A hurdle to industrial deployment of RTP is the lack of suitable equipment, since Microelectronics uses one-wafer reactors while Photovoltaics would need large capacity batch reactors or, better, in-line continuous equipment. It seems possible to furnish conveyor-belt furnaces with UV lamps to obtain these industrial RTP reactors, but some problems such as temperature uniformity must be solved [89].

7.6 MULTICRYSTALLINE CELLS

It has already been pointed out that the peculiarities of mc cells may prevent, in some cases, the use of standard processing technologies. Some of the proposed alternatives are not yet so cost-effective as to be incorporated in an industrial production line, but others are finding their way. Two main differences with single-crystalline silicon can be highlighted:

- Mc-material quality is poorer because of crystalline defects (such as grain boundaries, dislocations, etc) and metallic impurities (dissolved or precipitated), giving lower bulk lifetimes and hence lower cell efficiencies. To address this problem, two main strategies are followed: implementation of gettering steps and defect passivation with hydrogen.
- Texturing is more difficult because of different exposed crystallographic planes, so that standard alkaline solutions are not appropriate. To improve light-trapping and absorption, other techniques have to be implemented.

7.6.1 Gettering in mc Solar Cells

As already explained, gettering processes are also used in monocrystalline Si processing, but in the case of mc-Si they are even more important to improve material quality. P and Al gettering steps are routinely integrated in mc solar cell processing. Gettering conditions (temperature, process duration etc) differ from those of single crystal, because of the interaction among metal impurities, crystalline defects and other impurities present in mc-materials (mainly O and C).

It has been realized that gettering efficiency is strongly material dependent [90, 91]. This is explained by the fact that different techniques to grow mc-Si ingots produce wafers with different number and distribution of defects. Differences are even found in regions of the same ingot [92].

Additionally, a single mc wafer may exhibit nonuniform properties, both areal and in-depth, so that response to a gettering process can be inhomogeneous, affecting the final electrical performance of the solar cell [93, 94].

7.6.2 Passivation with Hydrogen

Silicon nitride is widely used as masking film in microelectronics [95]. For solar cells, it presents the advantage of performing as an effective antireflection coating. Films can