height change is handled without difficulty, although somewhat smoothed due to the lateral imaging resolution (Fig. 8). Finally, we show in Fig. 9 the results for a measured linear array or prisms with facets symmetrically arranged at an angle of 60°, and at a period of 0.64 mm (Fresnel Technologies part#420). For this sample we use a dye solution with t_S = 754 μm. The results shown in the linear profiles are in good agreement with the nominal values expected for all the arrays. Some particles contamination is noticeable in the case of the prism array of Fig. 8 and also bubbles are usually present in all measurements. They behave as blind spots but do not affect the processing of information of nearby areas because Eq. (4) is applied for every single pixel independently of the neighbors.

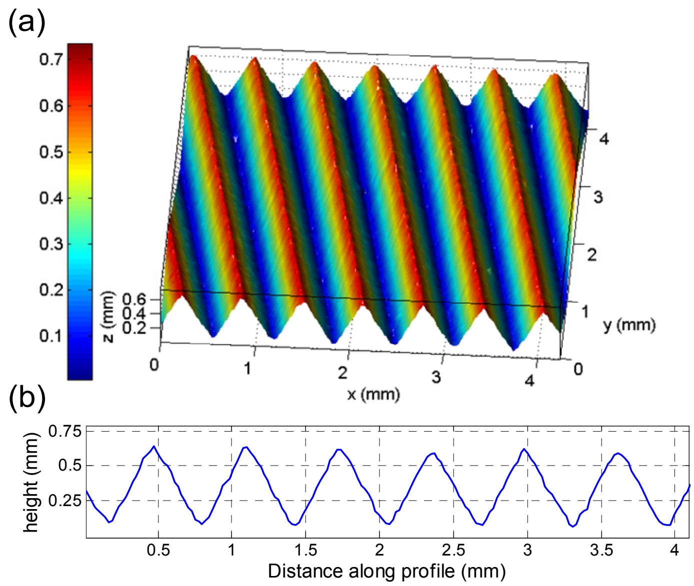

Fig. 9. Linear array of prisms (apex of 60°). (a) 3D rendering of processed image ratio *M*, (b) height profile along a line perpendicular to prism wedges. Notice the horizontal and vertical scales are the same in both representations.

5. Conclusions

We demonstrate the feasibility of topographic optical profilometry by absorption in liquids. The method is especially appropriate for all type of transmission optical devices with complex surface forms and patterns. Height resolution and form accuracy in the order of the nanometer has been achieved. The method can handle steep surface slopes in contrast to other know reflection based techniques. We may point out also other features: 1) it is simple to implement with no-moving parts in contrast to confocal and/or interferometric profilometers and 2) it can be fast besides some sample preparation that is required.

Acknowledgments

This work has been developed within the framework of the project DPI2009-09023 financially supported by Spanish MICINN (Ministerio de Ciencia e Innovación).