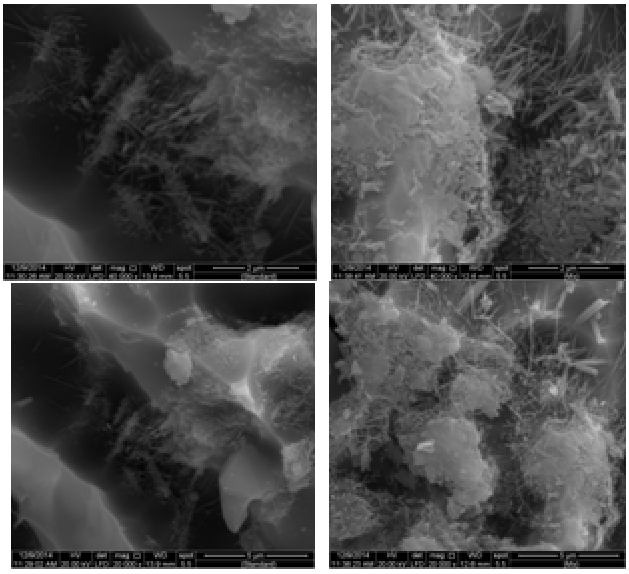

Figure 12: SEM of standard mix1 (left) and blended one mix5 (right) which explain crystalline nature of suggested mix compared with standard one

Porcelain stoneware tiles are characterized by very low water absorption, though a residual closed porosity is present in significant amounts as approved from general view of microstructure at 100μ (Fig 11)leading to a different compactness and microstructure. Products exhibit excellent mechanical properties: 50–70MPa of bending strength, with a clear dependence of these properties on porosity and phase composition. Mullite and crystalline net tend to increase the mechanical performances, through a predominant mechanism of matrix reinforcement, while quartz and glassy phase play an opposite role. This is approved as shown in Fig (12). So the strength of body containing scrap as source of crystalline phases is higher than the standard.

4. Conclusions

The fired scrap resulting from the sainataryware production can be incorporated into porcelain stoneware production tiles as economic, technological and environmental correct solution. It presents partially replaced with feldspar in uncolored porcelain tile recipes till 25% with slight darkening of color; while 0-8 % addition is better in case of coloring. In conclusion, the addition of fired sainataryware scrap to porcelain stoneware tiles reduces the sintering interval and helps to obtain better mechanical properties.

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