

Supplementary Material 1. Phase relations in Obsidian Cliffs lithophysae compared to other locations with resembling lithophysal mineralization.

Location	Ref.	fayalite	tridymite	quartz	osumilite	hematite	titanite	phlogopite	mullite	pseudobrookite	augite	amphiboles	anorthoclase
Obsidian Cliffs, Oregon	[1] [2]	X	X		X	X		X					
Monte Arci, Sardinia	[3]		X		X			X					
Henderson Quarry, Ngongotaha Dome, New Zealand	[4]* [5]*	X X	X X	X X		X X	X X	X X				X X	X X

References : [1] this study [2] Olsen and Bunch (1970) [3] Elmi et al. (2010) [4] Richnow (1999) [5] Grapes et al. (1993)

*in these studies, all the minerals were not observed in the same lithophysae (see Richnow 1999 for details)