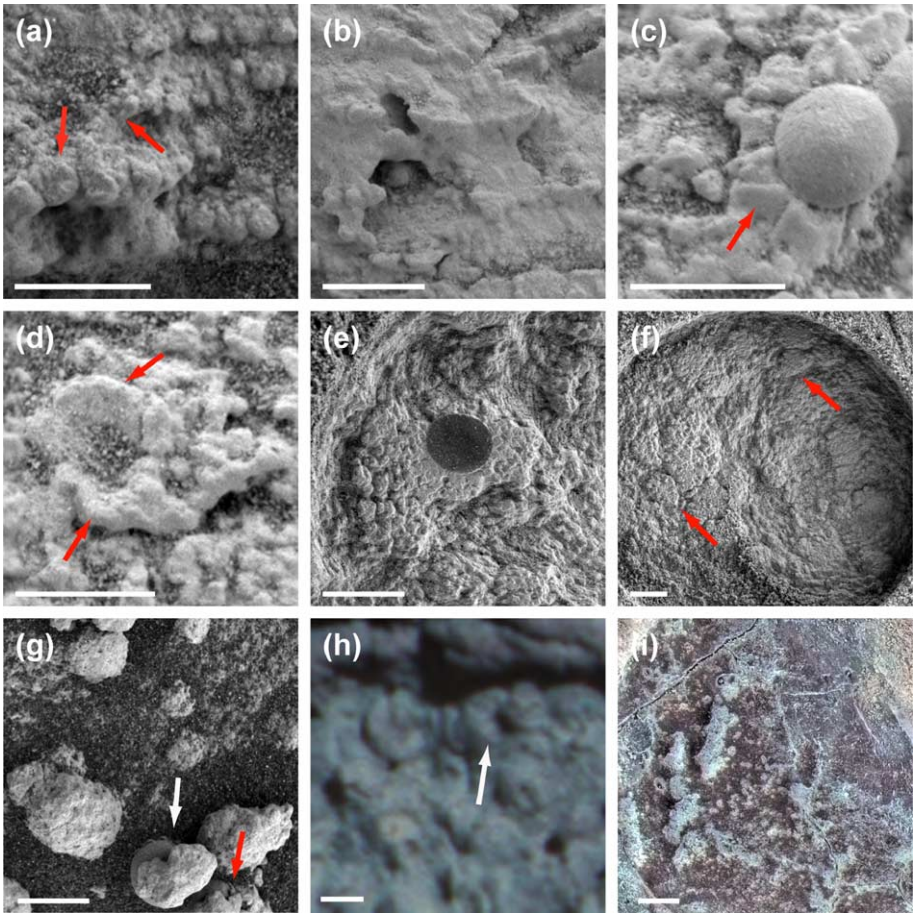

Fig. 5. MI and Pancam images illustrating the types of diagenetic cement encountered in the Burns formation (scale bars are 5 mm across). (a,b) Close up of MI images taken on Sols 42 (Flatrock) and 125 (Diogenes) showing early pore-filling cement. Note that the degree to which grain boundaries are obscured is much greater in (b) than in (a), due to a greater degree of cementation and recrystallization. (c) Close up of MI image taken in upper unit on Sol 28 (Algerita) showing isopachous blocky cements, about 2 mm thick, around spherules. (d) Close up of MI image taken in upper unit on Sol 28 (Algerita) showing zone of isopachous blocky cement where a spherule had been present but now eroded out of the outcrop. (e) MI image of abraded surface taken in middle unit on Sol 177 (Diamond Jenness, RAT-1) showing grain-cemented overgrowths on spherule. Note that in this lower part of the section, the nature of this second generation of cement differs from that in the upper unit (compare with Fig. 5c,d). (f) Part of MI mosaic of abraded rock surface (Diamond Jenness, RAT-2) taken on Sols 178 and 179. Note the nodular texture. The cementation that gives rise to this texture is assumed to be associated with the same diagenetic process that caused the overgrowths on the spherules but centered on different, indistinct nucleation sites. (g) Part of MI mosaic of soil taken on Sol 199 showing that the nodules are relatively resistant and remain intact when they erode out of the outcrop. Arrows show two of the nodules that clearly have spherules at their cores. (h) Close up of false color Pancam image of boulder Ellesmere. Note that the overgrowths on these spherules have a spoke-like appearance, suggestive of a radial fibrous texture. Concerns about rover safety precluded closer approach to confirm this possibility. This image was taken on Sol 205, sequence P2559, using 750 nm, 530 nm and 480 nm filters. (i) Part of stretched false color MI mosaic of abraded rock Lion Stone taken on Sol 108. Note that this surface is characterized by very low porosity. Based on resistance measurements collected during RAT grinding, this rock type is by far the hardest encountered in the Burns formation. See Fig. 11c,d for another example of this cement type.

tite ± amorphous silica. Cements that have been identified include the following:

1. Early fine-grained (<100 μm) pore-filling cements.
2. Cements found around spherules and in isolated nodules. In most places this cement does not obscure primary stratification, however, in the lower part of the section, and especially at the Whatanga contact separating the middle and upper units, cementation/recrystallization can be so pervasive that primary stratification is obscured.
3. Rare, *possible* isopachous radial fibrous cements around spherules. If present, they may be equivalent to blocky cements surrounding spherules (a variety of type 2), described above, but are significantly larger (see details below).