## Contents

1 Two Major Patterns of Single Mineral Replacement in Granites .................................. 1
   1.1 Hetero-Oriented or Nibble Replacement Pattern ........................................... 1
      1.1.1 Hetero-Oriented Albitization .......................................................... 1
      1.1.2 Hetero-Oriented K-feldspathization ............................................... 10
      1.1.3 Hetero-Orientated Muscovitization ............................................... 21
      1.1.4 Quartzification .................................................................................. 28
      1.1.5 Protolithionitization ................................................................. 30
      1.1.6 Beryllization .................................................................................... 33
      1.1.7 Calcitization or Calcite Replaces Quartz and K-feldspar .............. 33
      1.1.8 Pyritization ..................................................................................... 34
   1.2 Co-oriented Replacement Pattern ................................................................. 35
      1.2.1 Co-orientated Muscovitization of Biotite ....................................... 36
      1.2.2 Co-orientated Chloritization of Biotite ........................................... 37
      1.2.3 Co-oriented Albitization or Deanorthitization of Plagioclase ........ 38
      1.2.4 Co-oriented Albitization of K-feldspar (K-feldspar Is Transformed into Albite) ........................................................................................................... 39
      1.2.5 Pseudomorphic Replacement of Chlorapatite by Hydroxy-Fluor-Apatite ................................................................. 46
   References ................................................................................................. 50

2 Formation Mechanisms for Mineral Replacement ............................................. 53
   2.1 Passage for Gas and Liquid from Outside .................................................... 53
   2.2 Mechanism of Dissolution–Reprecipitation ............................................... 55
      2.2.1 Different Degree of Hetero-Orientation Replacement for Various Minerals ......................................................... 55
      2.2.2 Presence of Crystal Nucleus on Which the Replacive Mineral Can Epitaxially Grow ............................................ 57
      2.2.3 Explanation of Nibble Replacement of Albitation. ........................... 57
   2.3 Mechanism of Ion Exchange or Substitution .............................................. 59
   2.4 Co-oriented Replacement of Feldspar Minerals ......................................... 60
      2.4.1 Co-oriented Albitization of Plagioclase ........................................... 60
      2.4.2 Co-oriented Albitization of K-Feldspar ........................................... 60

References ................................................................................................. 50
2.5 Presence of Micropores in Feldspar Is Probably One of the Key Factors to Allow the Co-oriented Replacement ................................. 60
2.6 Relation Between the Two Patterns of Replacement .............. 64
  2.6.1 Muscovitization of Biotite ................................. 65
  2.6.2 Albition of K-Feldspar ................................... 65
  2.6.3 Albition of Plagioclase .................................. 67
References ......................................................... 67

3 Discussion About the Origin of Mineral Textures in Granite .................. 69
  3.1 Origin of Cleavelandite (Small Platy Albite) ...................... 69
    3.1.1 Metasomatic Hypothesis .................................. 69
    3.1.2 Magmatic Hypothesis .................................... 70
  3.2 Origin of Myrmekite .......................................... 73
    3.2.1 Hypotheses for Origin of Myrmekite ....................... 75
    3.2.2 Discussion of the Origin of Myrmekite ..................... 76
  3.3 Origin of Perthite ........................................... 83
    3.3.1 Content and Shape of Perthitic Albite .................... 84
    3.3.2 Form and Distribution of Perthitic Albite ................. 86
    3.3.3 Hypotheses for Origin of Perthitic Albite ................. 87
    3.3.4 Elongated Enclosed Crystals May Be Parallely Distributed in Feldspar ........................................... 92
    3.3.5 Possible Origin of Perthitic Albite ......................... 94
    3.3.6 Antiperthite ............................................... 98
  3.4 K-Feldspar Phenocryst or Porphyroblast .......................... 98
    3.4.1 Theory of Porphyroblast Origin ........................... 99
    3.4.2 Theory of Magmatic Origin ................................ 102
  3.5 Study of History of Metasomatic Processes ....................... 103
    3.5.1 Hetero-Oriented Albition Occurs Earlier Than Quartzification ........................................... 103
    3.5.2 Swapped Albite Rows Are Formed First, Followed by Beryllization ........................................... 104
    3.5.3 Triple Nibble Replacement ................................ 105
    3.5.4 Hetero-Oriented Muscovitization and Co-oriented Chloritization of Biotite ................................. 108
    3.5.5 Hetero-Oriented Albition, Protolithionitization, Muscovitization and Quartzification ................................. 108
  3.6 Successive Sequence of Multi-metasomatic Processes in Alkali Metasomatites ............................................... 111
    3.6.1 Co-oriented Albition Later Than Earliest Hetero-Oriented Albition ........................................... 112
    3.6.2 Calcitization Replacing Quartz and K-Feldspar .......... 112
    3.6.3 Late Stage Clear Rim Albition Replacing Calcite ........ 117
    3.6.4 Albite Microvein and Vein Selvage Albition Replacing Calcite ........................................... 117
Metasomatic Textures in Granites
Evidence from Petrographic Observation
Rong, J.; Wang, F.
2016, XIX, 144 p. 213 illus., 179 illus. in color., Hardcover
ISBN: 978-981-10-0665-4