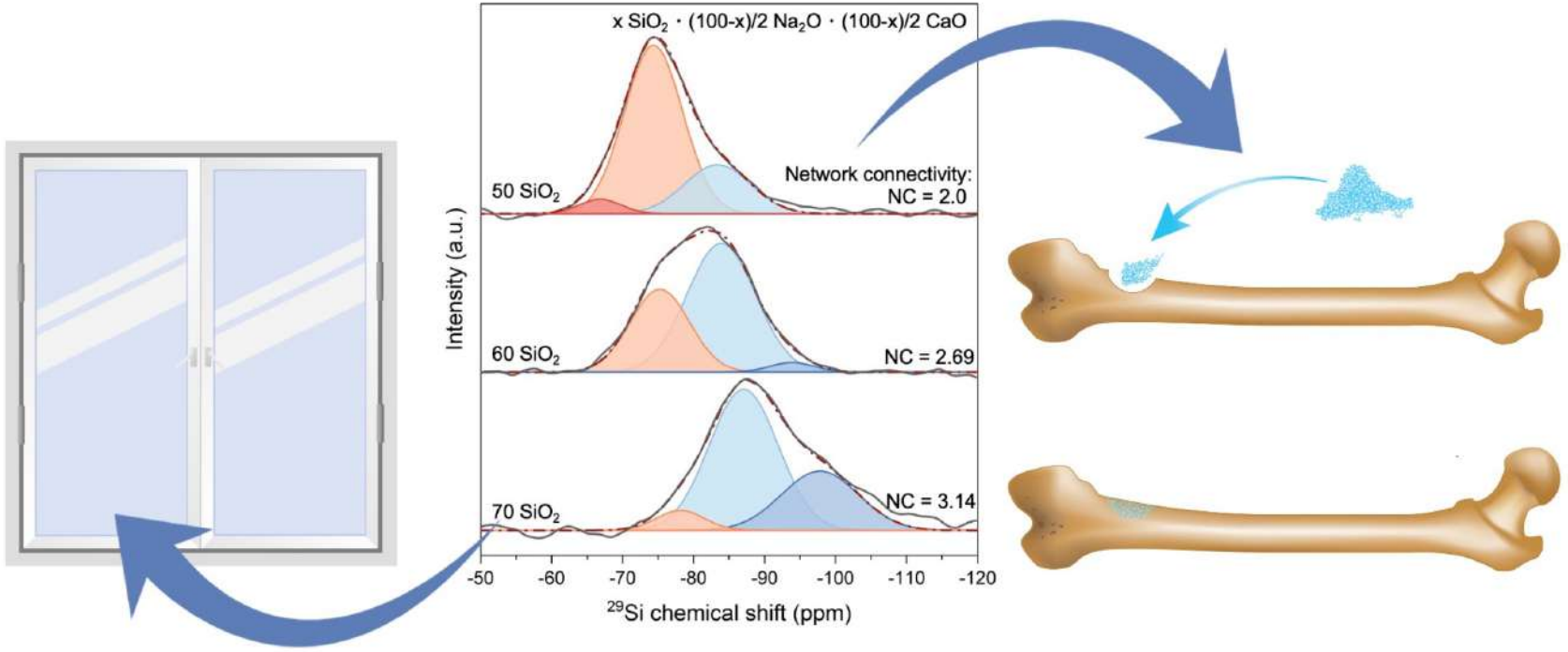
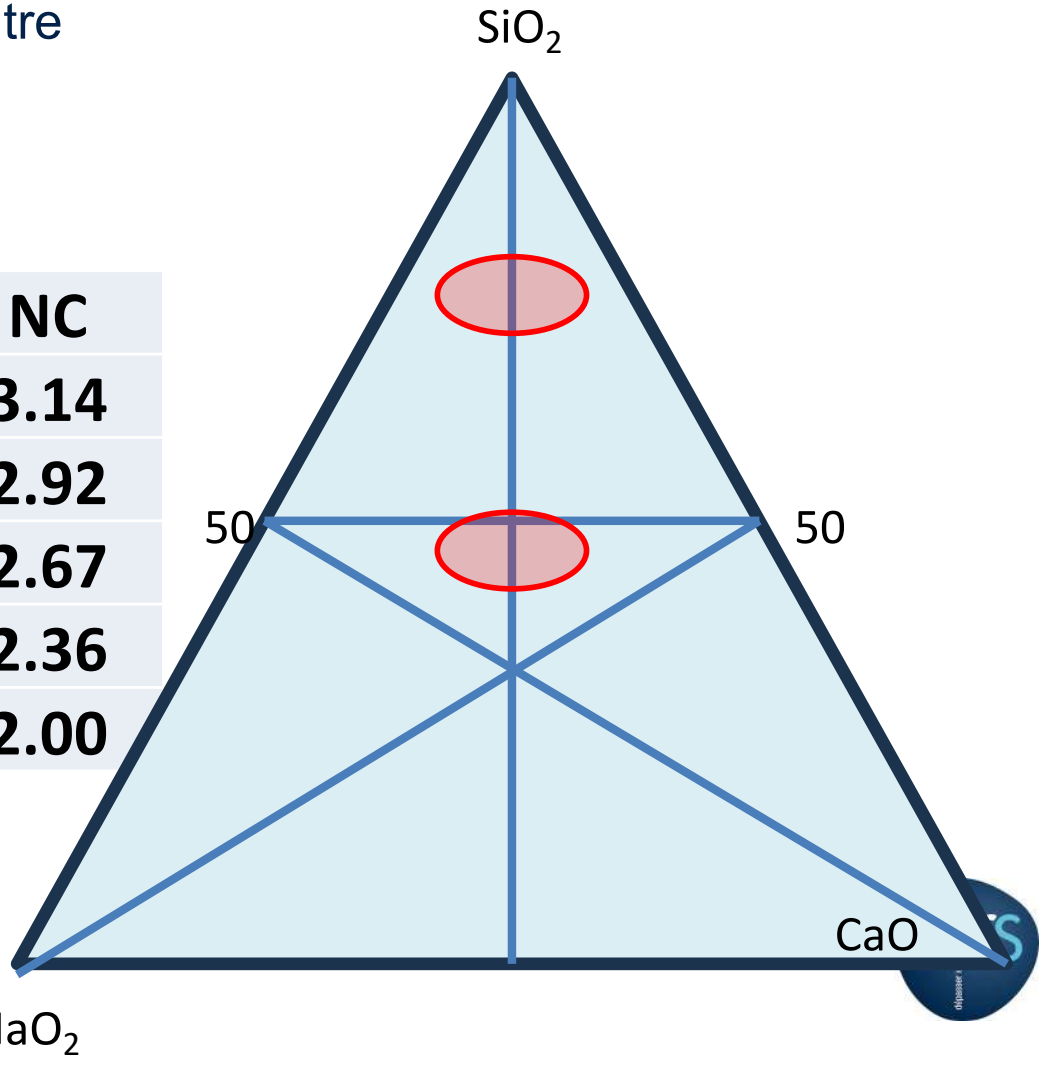
Les bioverres ?



Composition (mol%):
(70 – x) SiO2– (15 + x/2) Na2O – (15 + x/2) CaO
Avec x = 0 – 30 et à 70 SiO2 = verre à vitre

Glass	SiO2	CaO	Na2O	NC
Si70	70	15	15	3.14
Si65	65	17.5	17.5	2.92
Si60	60	20	20	2.67
Si55	55	22.5	22.5	2.36
Si50	50	25	25	2.00

NC = (4*SiO2-2*(CaO+Na2O))/SiO2



Composition (mol%):
(70 – x) SiO_2– (15 + x/2) Na_2O – (15 + x/2) CaO
Avec x = 0 – 30 et à 70 SiO_2 = verre à vitre

Glass	SiO2	CaO	Na2O	NC
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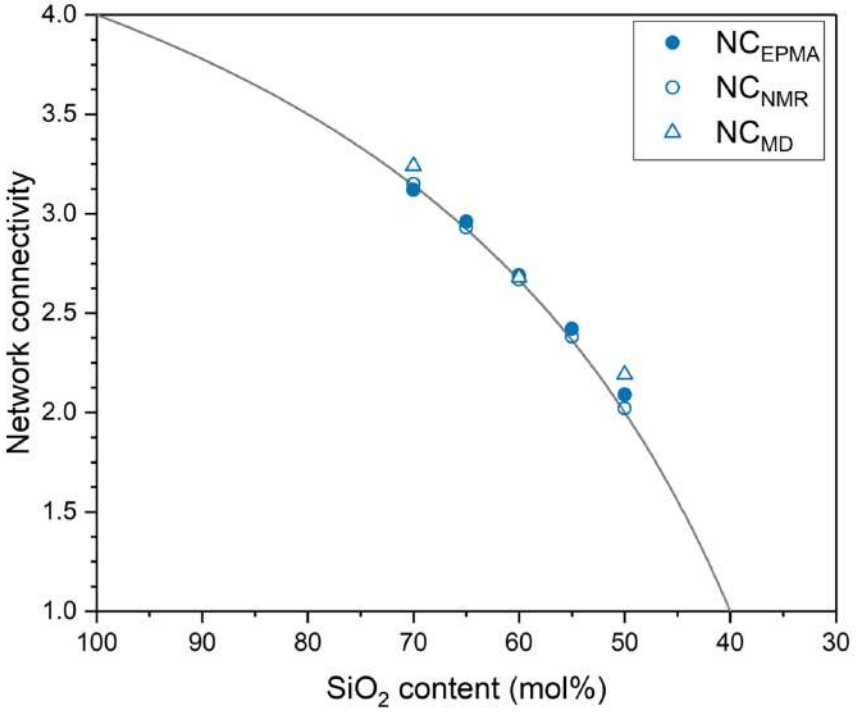
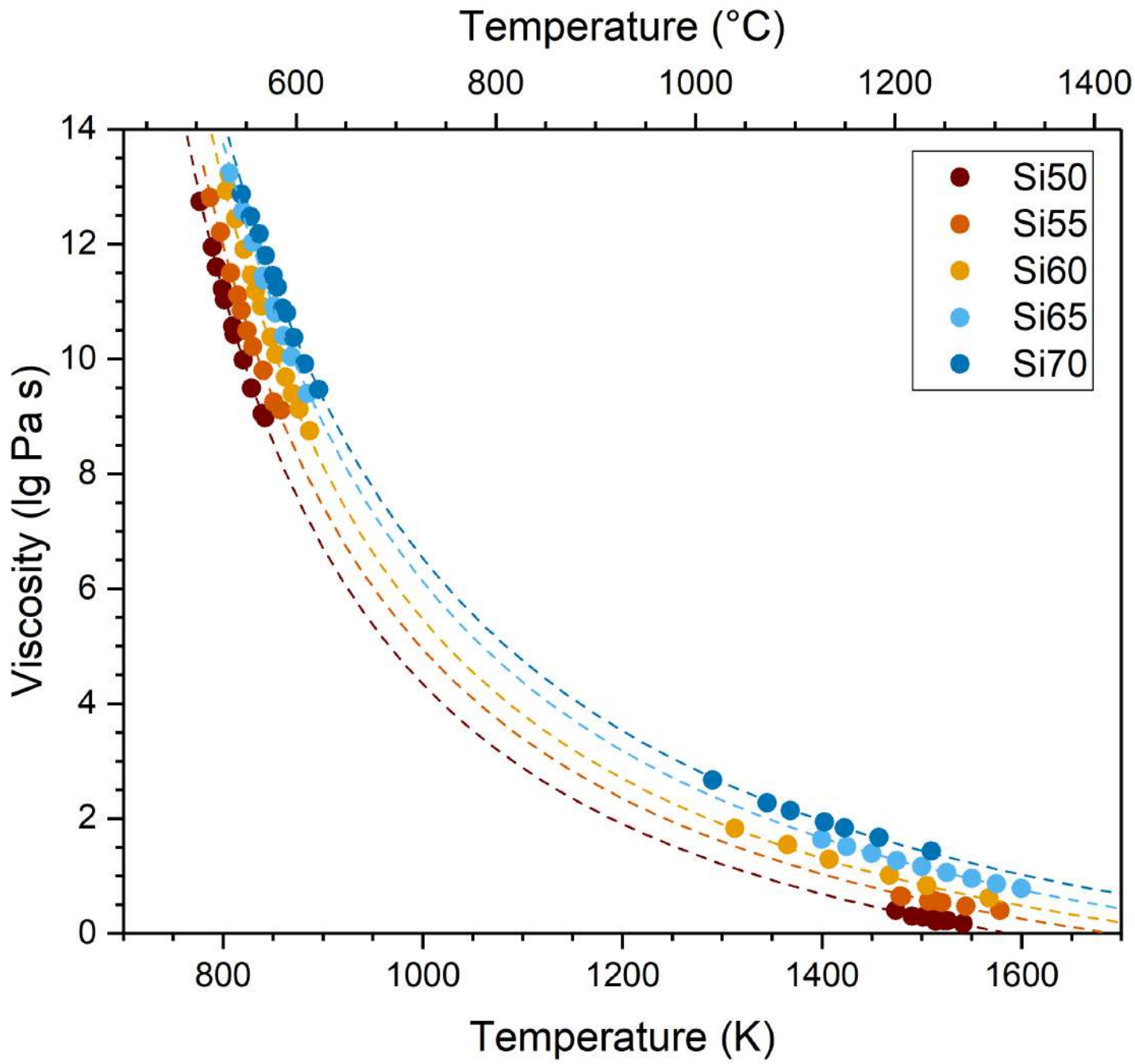
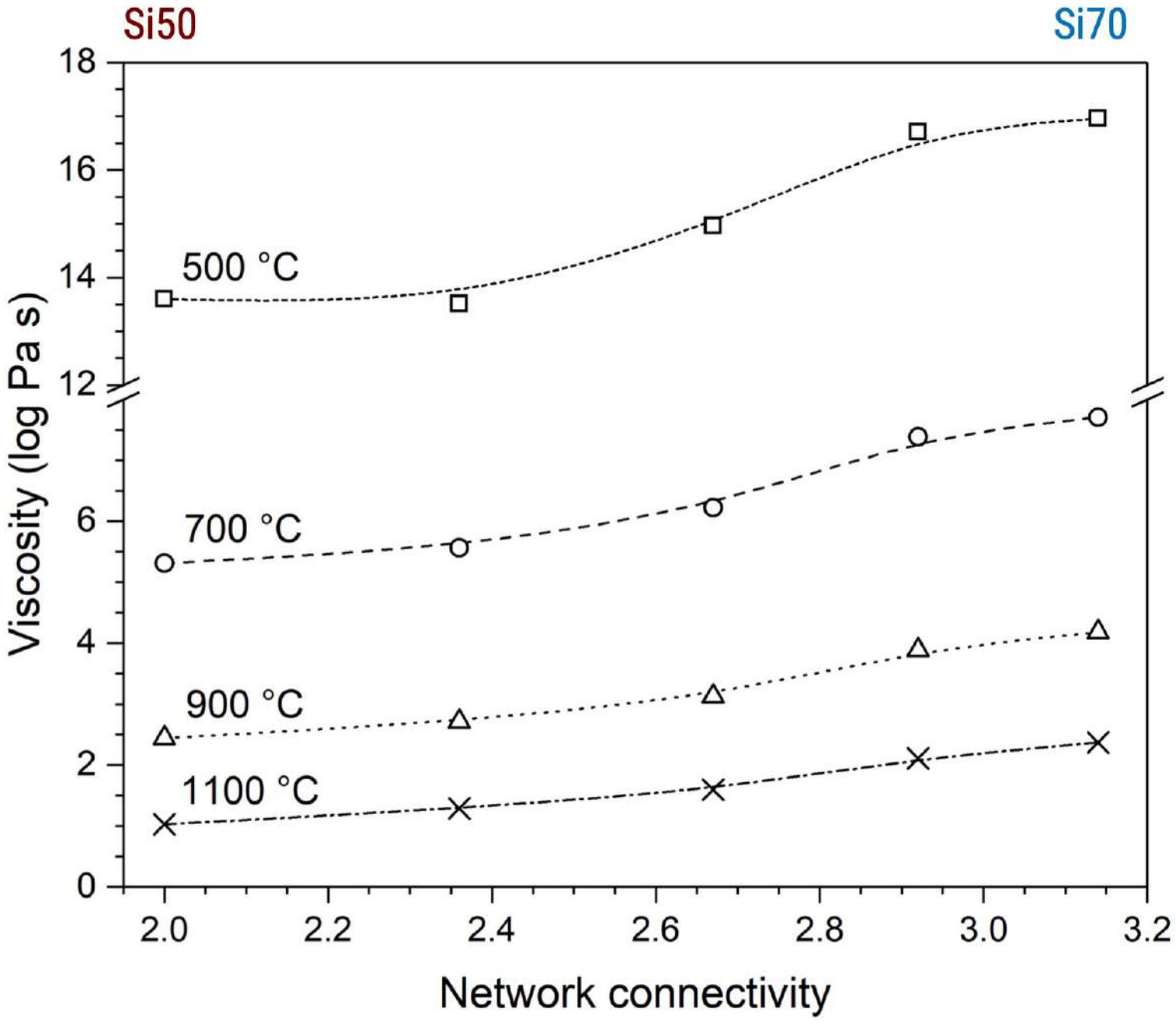
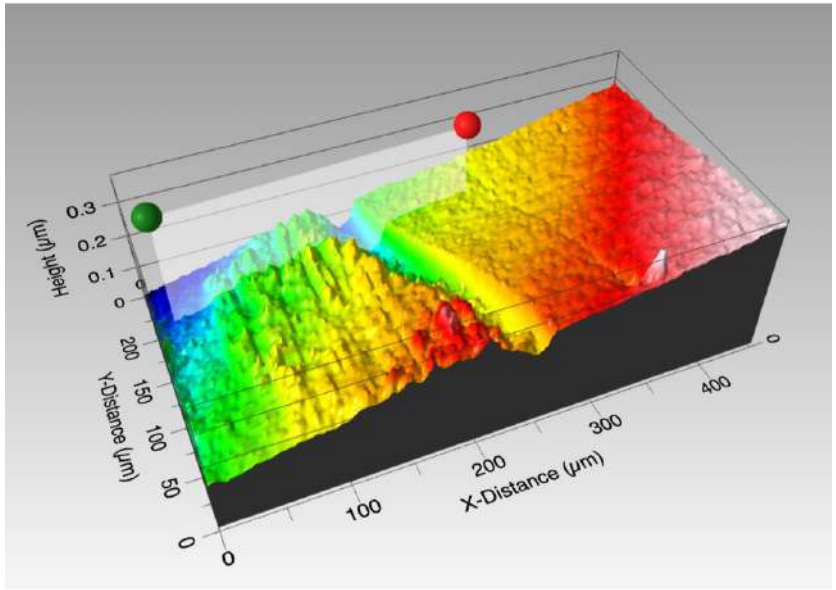


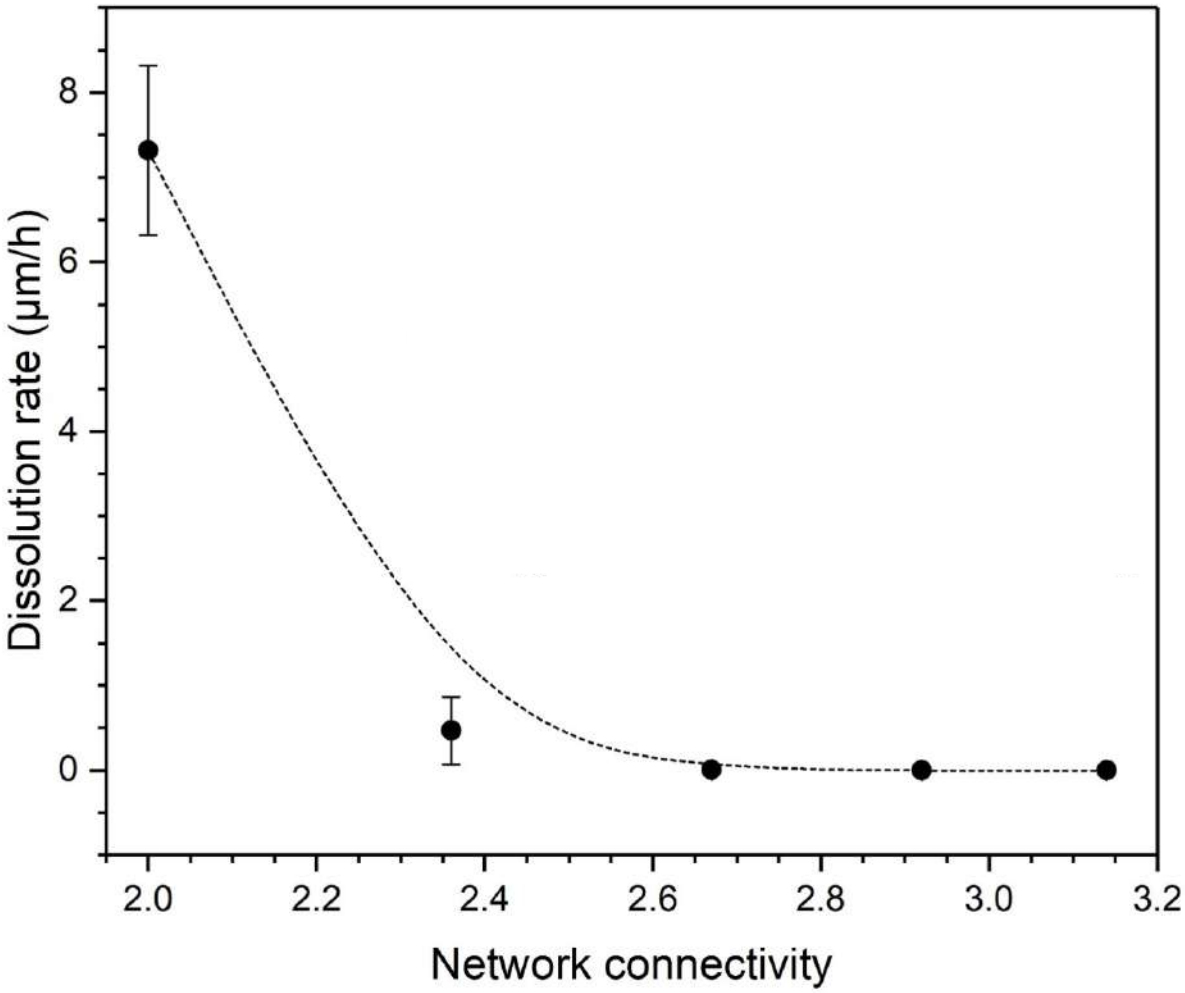
NC = (4*SiO2-2*(CaO+Na2O))/SiO2


Temperature (°C)
600
800
1000
1200
1400
Viscosity (lg Pa s)
0
2
4
6
8
10
12
14
800
1000
1200
1400
1600
Temperature (K)
Si50
Si55
Si60
Si65
Si70

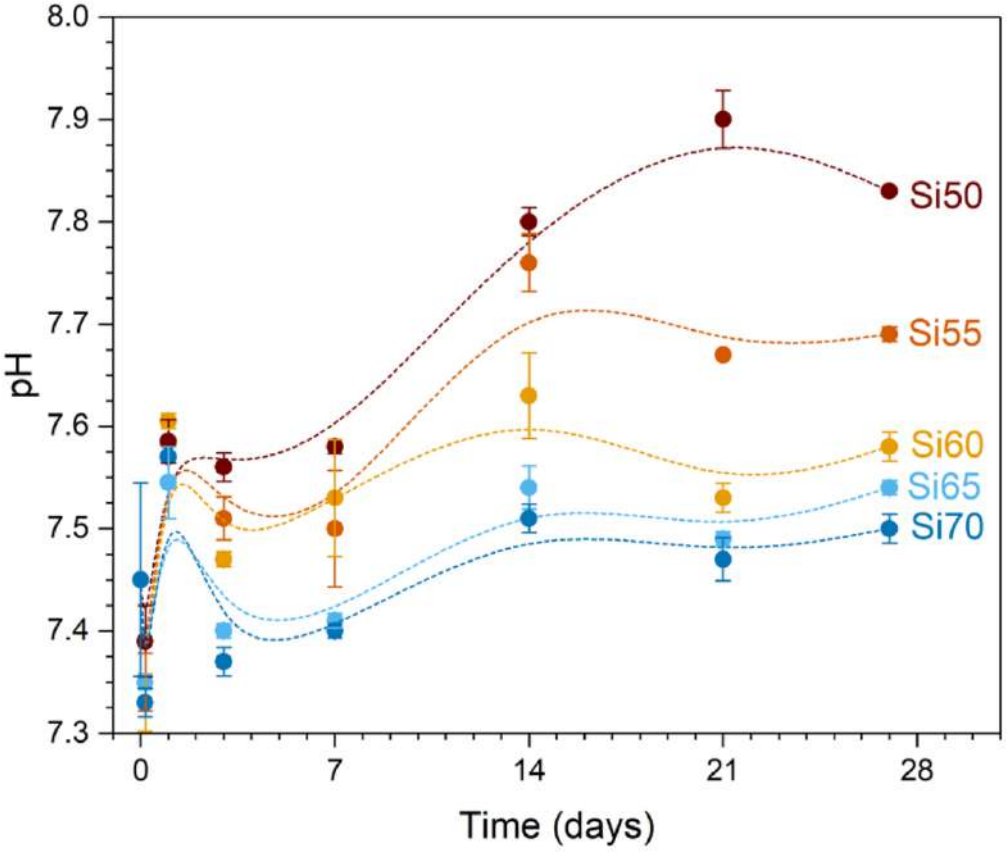

Si50
Si70
Viscosity (log Pa s)
Network connectivity
500 °C
700 °C
900 °C
1100 °C
0
2
4
6
12
14
16
18
2.0
2.2
2.4
2.6
2.8
3.0
3.2

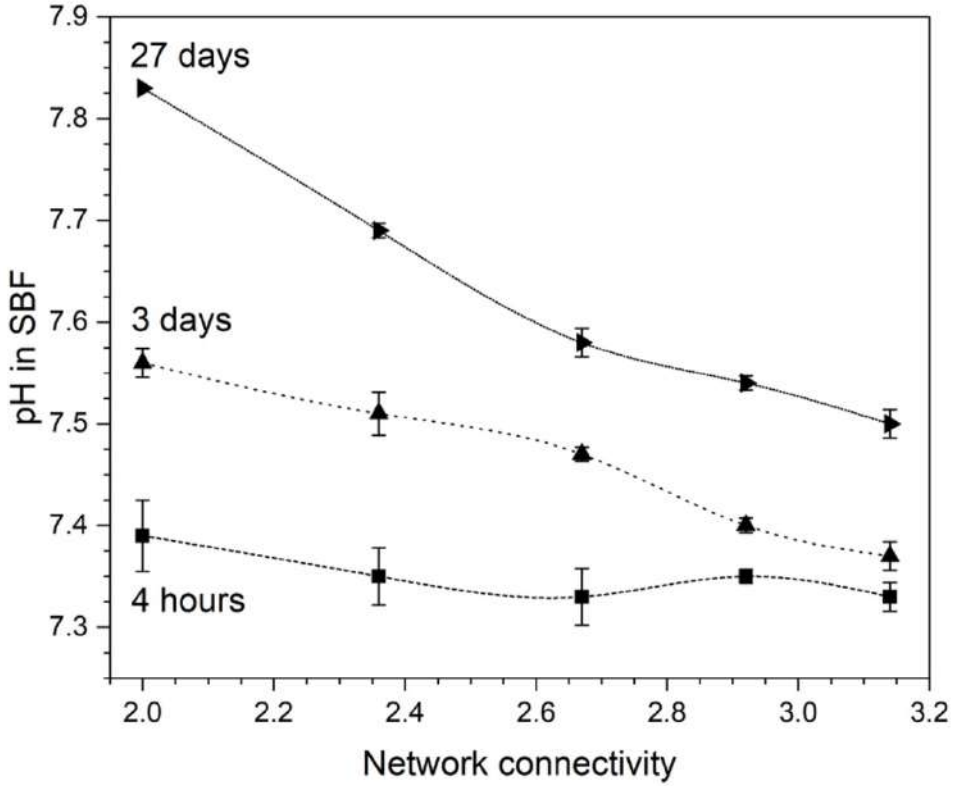


Dissolution dans Tris-HCl buffer solution (pH 7.4, 37°C)



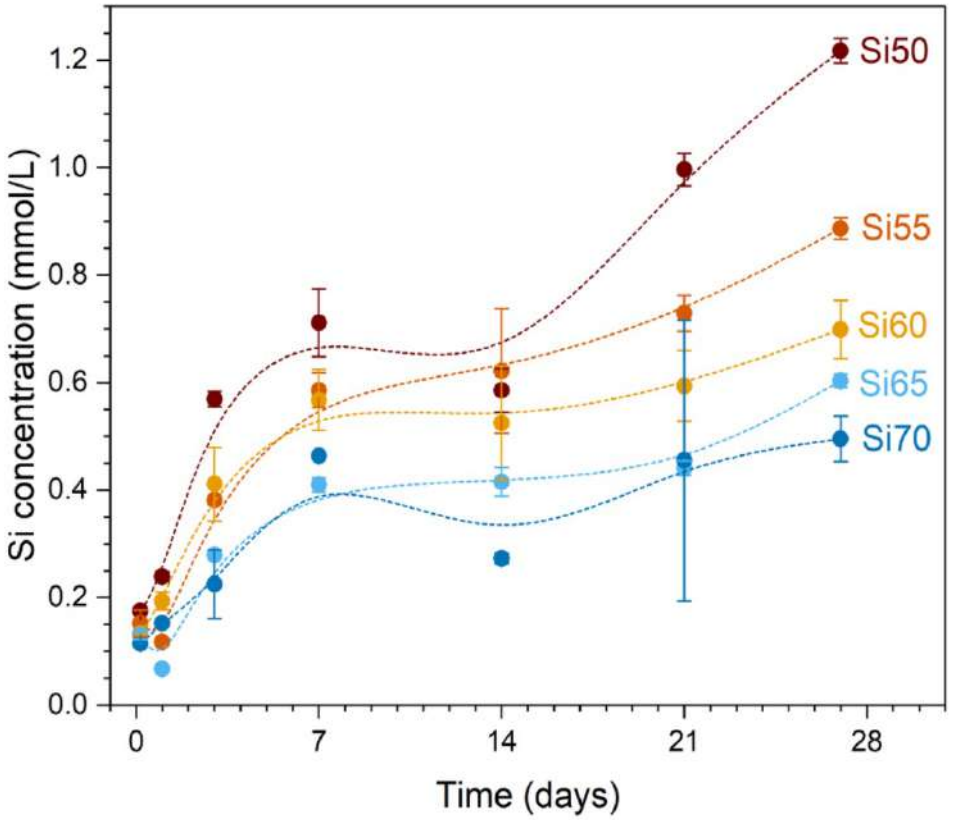
Comment évolue le Ph

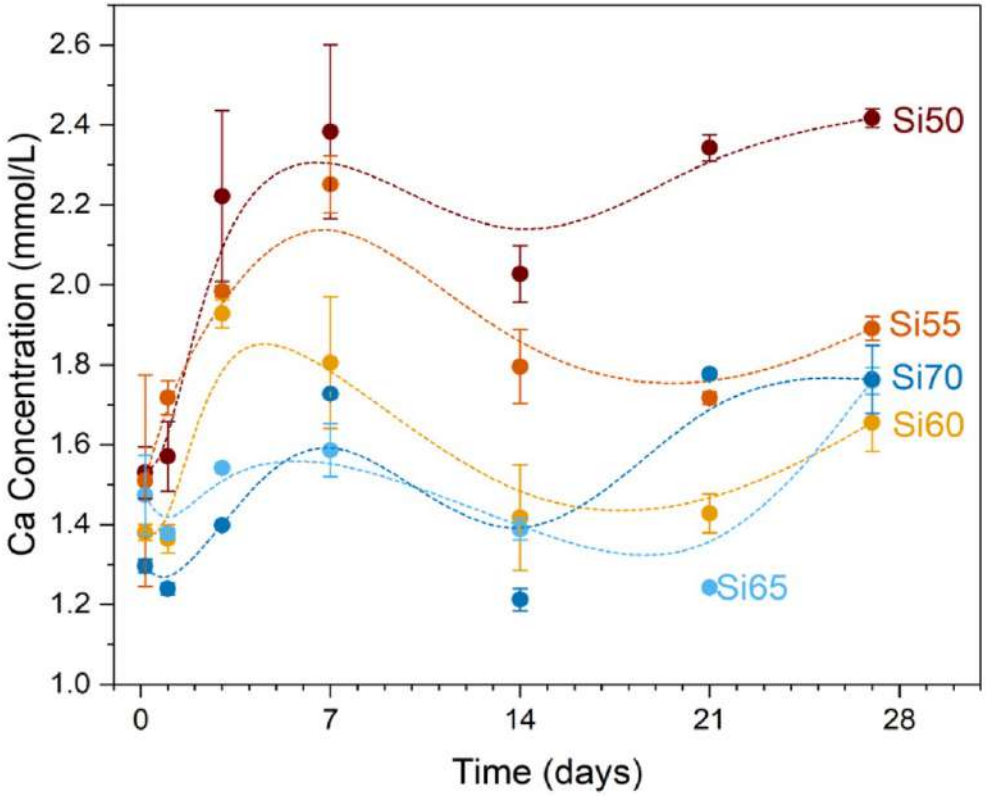




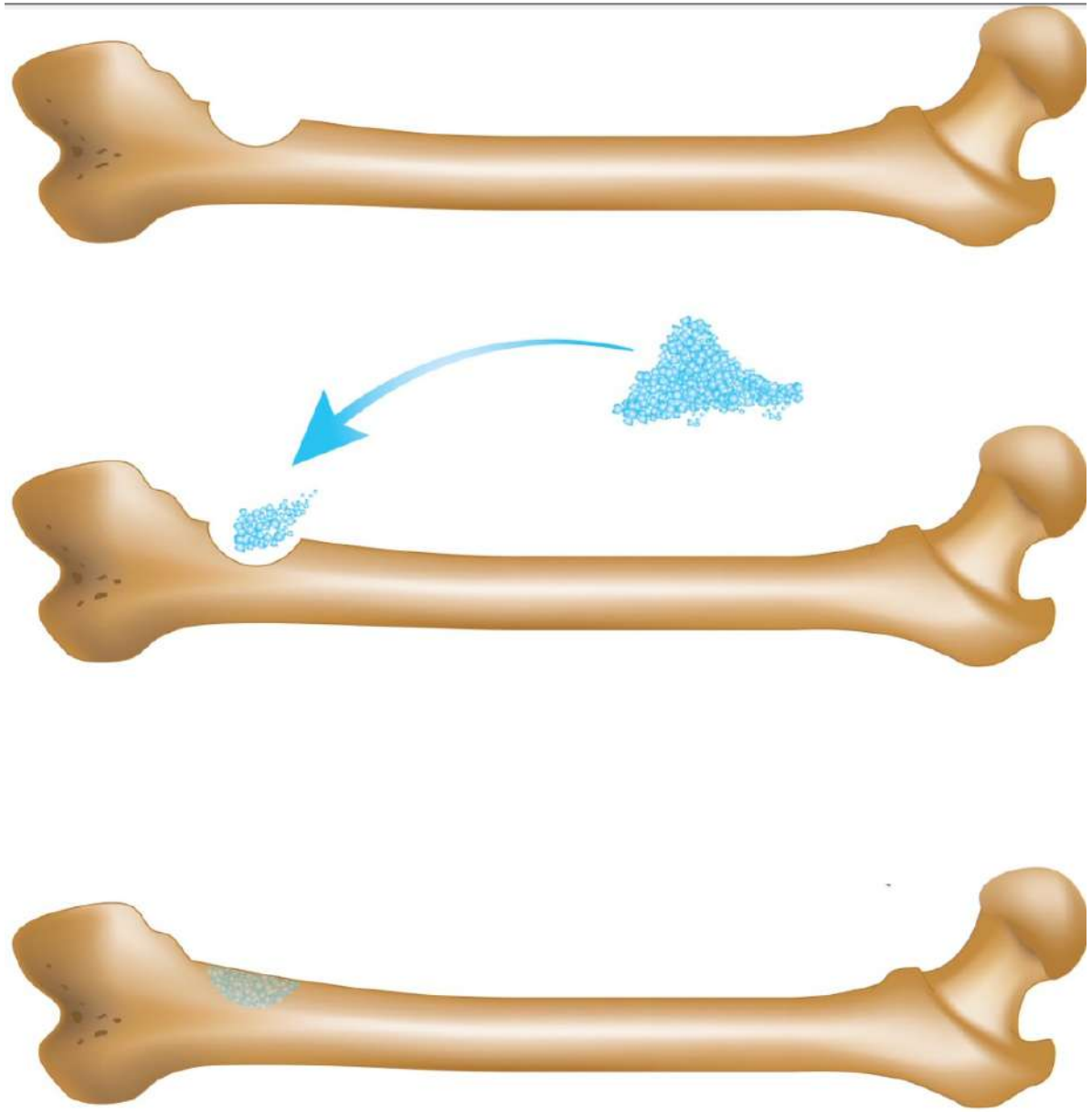
Immersion du verre dans un liquide qui simule le fluide du corps (pH 7.4, 37°C)

Comment évolue les cations relâchés?





Immersion du verre dans un liquide qui simule le fluide du corps (pH 7.4, 37°C)



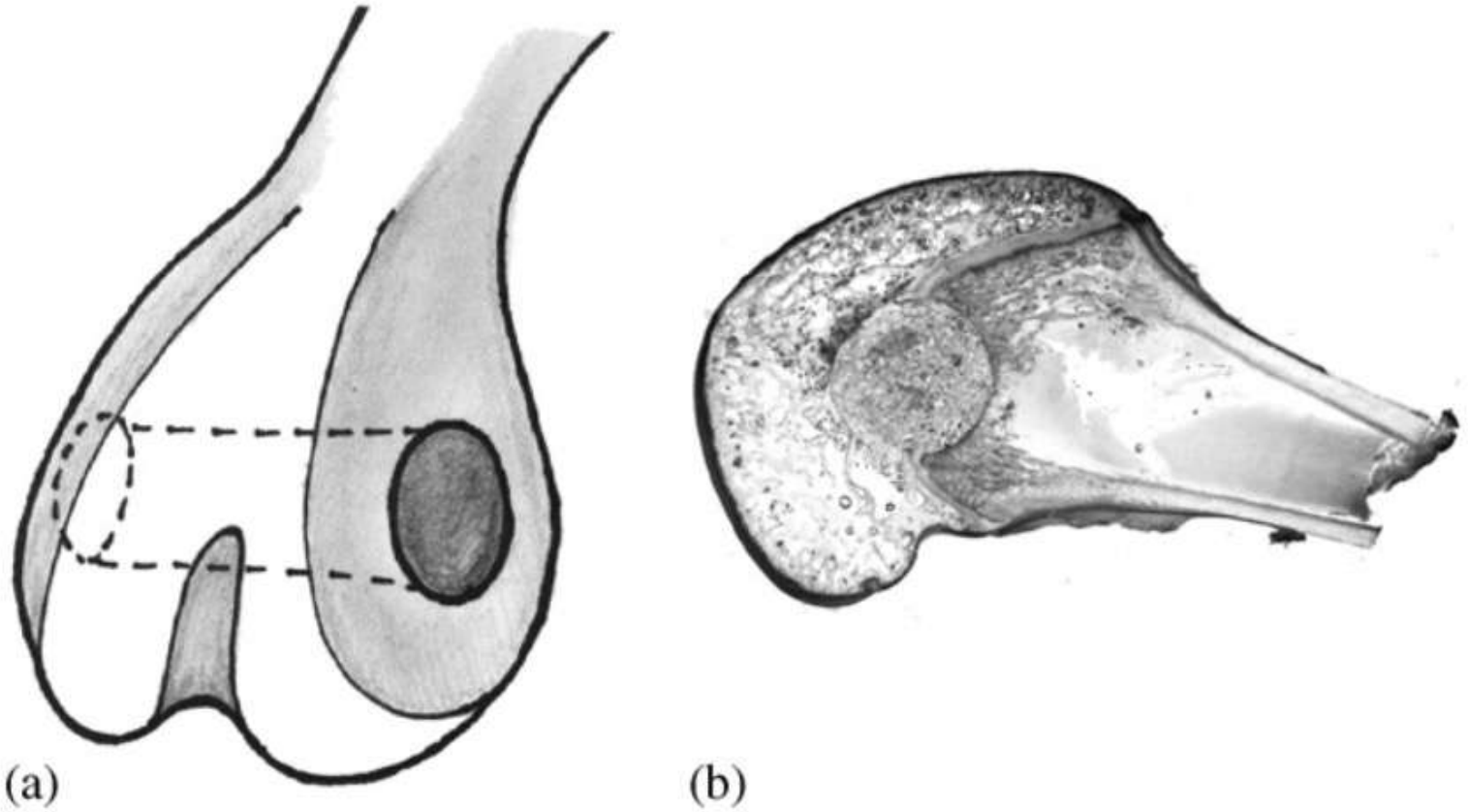
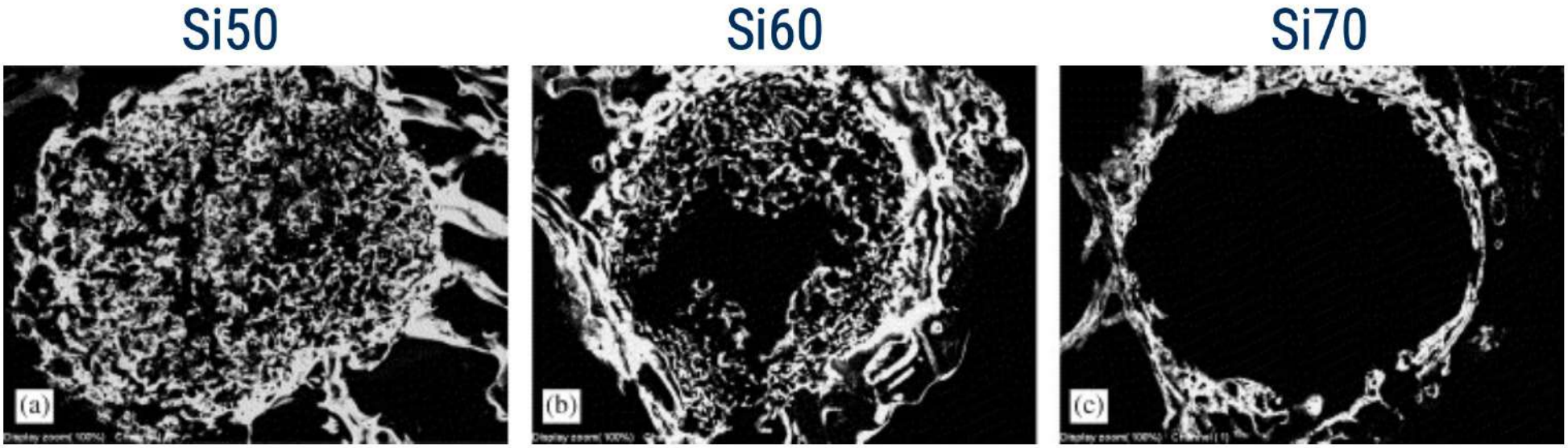


Fig. 1. (a) Schematic drawing of implantation: a 6-mm diameter hole was drilled into the femoral condyle; (b) cross-sections from the femoral condyle.



Granules de verres SiO2-CaO-Na2O implantés dans un défaut du fémur (os de la cuisse) de lapins ; coloration à la calcéine fluorescente ; par microscopie confocale à balayage laser. Durée : 6 semaines

Traitement d'un kyste osseux dans le doigt d'un garçon de 2 ans

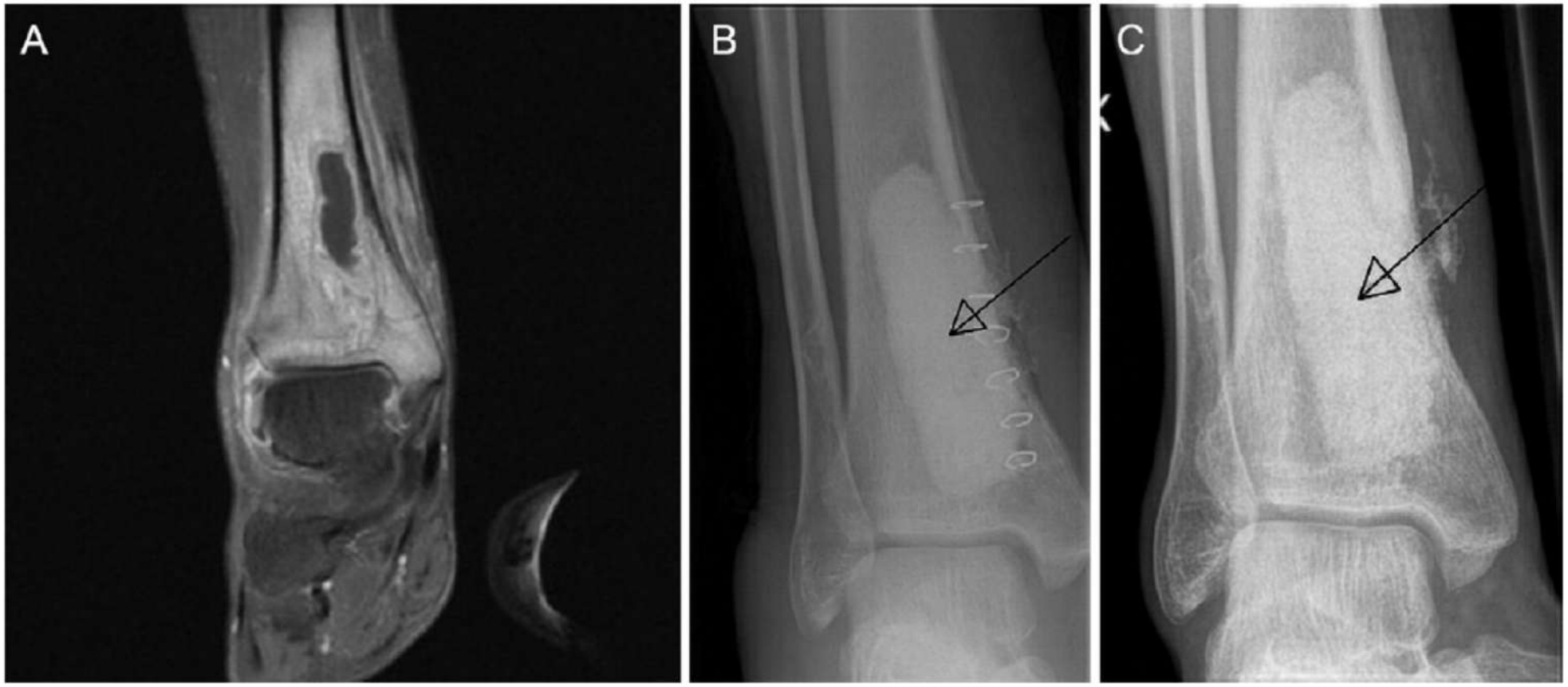
X-ray before surgery

1 month after

2 years later

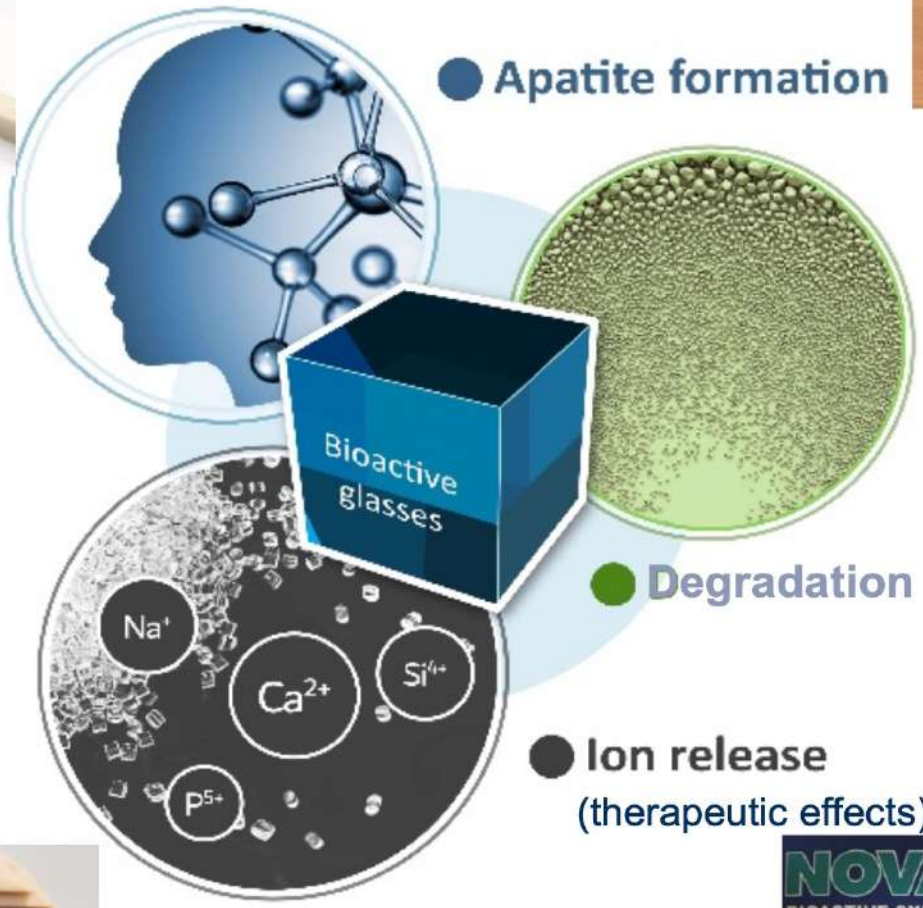
NC Lindfors: Bone 45 (2009) 398-400

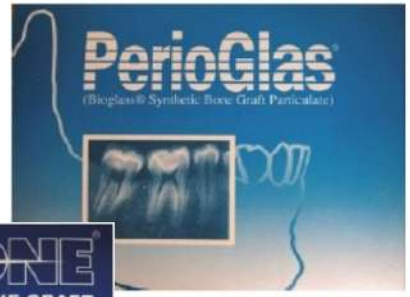
Traitement de l'infection osseuse chronique (ostéomyélite)

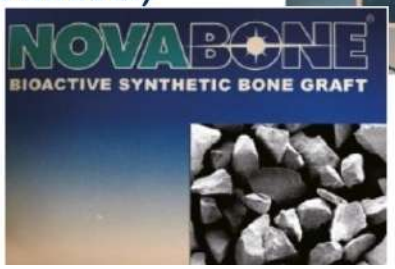


NC Lindfors et al.: Bone 47 (2010) 212-218

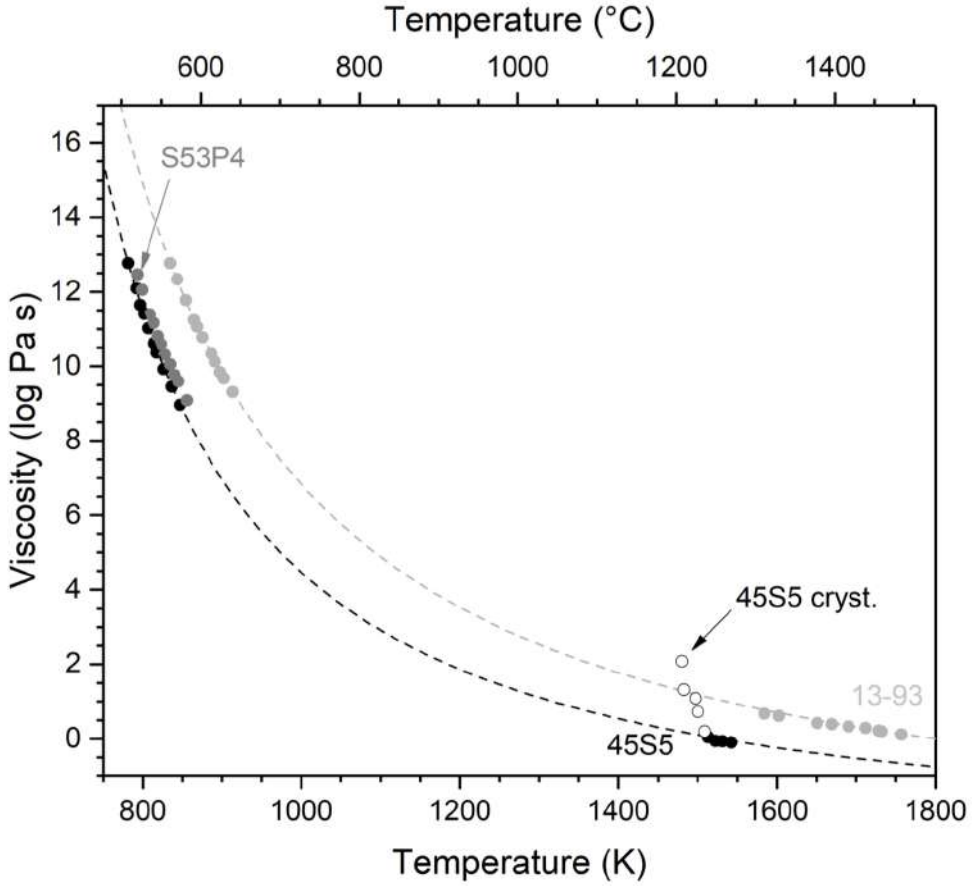
Bioactive glasses

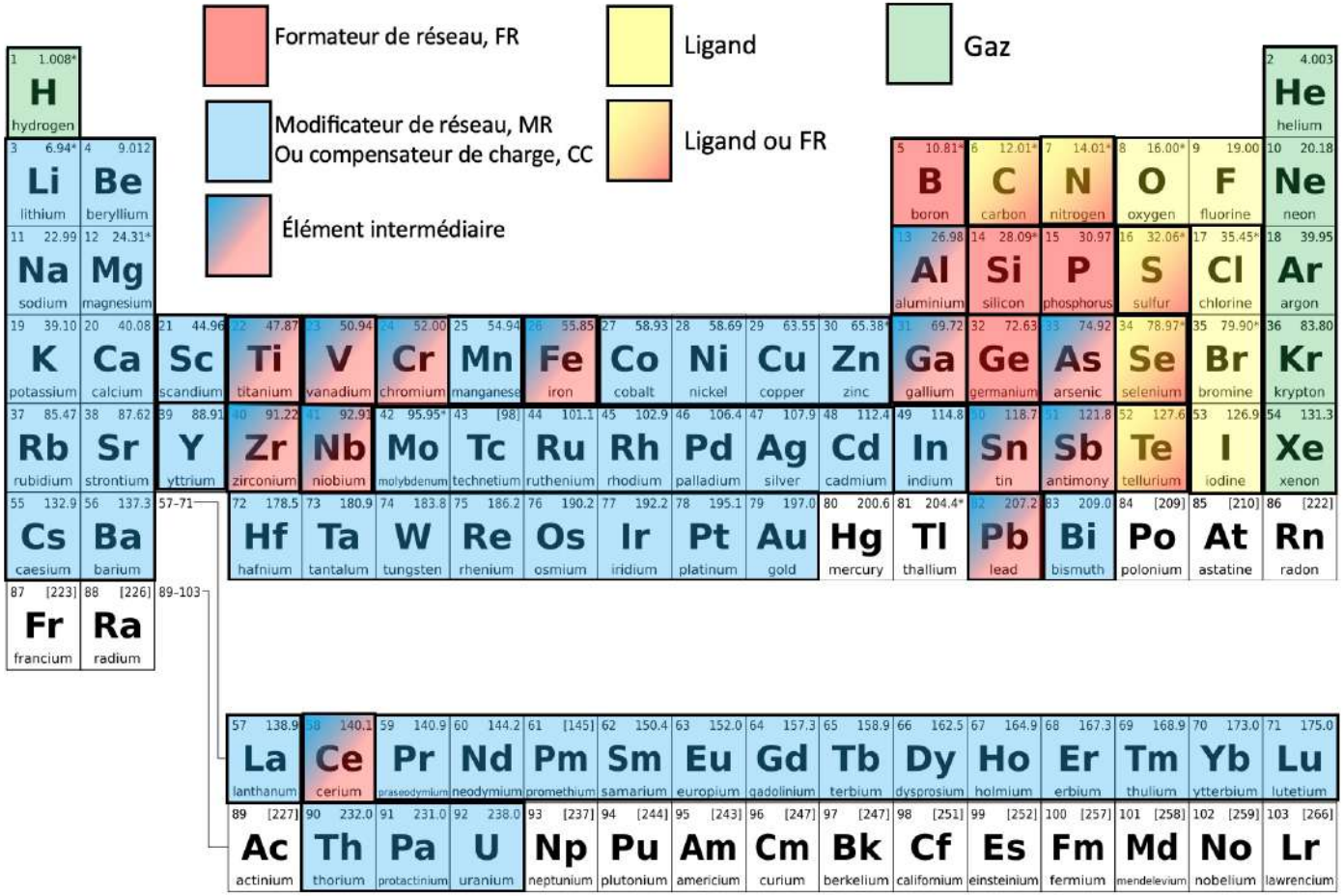






Glass	SiO_2	P_2O_5	CaO	Na_2O	MgO	K_2O	NC
45S5	46.1	2.6	26.9	24.4	-	-	2.12
S53P4	53.9	1.7	21.8	22.6	-	-	2.54
13-93	54.6	1.7	22.1	6.0	7.7	7.9	2.59





Comptes Rendus
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https://doi.org/10.5802/crgeos.171

Glass, an ubiquitous material / *Le verre, un matériau omniprése*

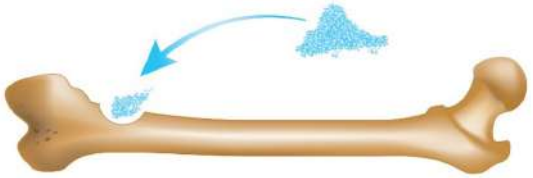
Glass, an ubiquitous material

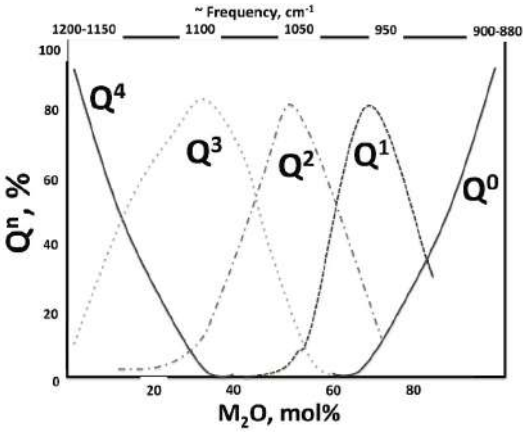
Le verre, un matériau omniprésent

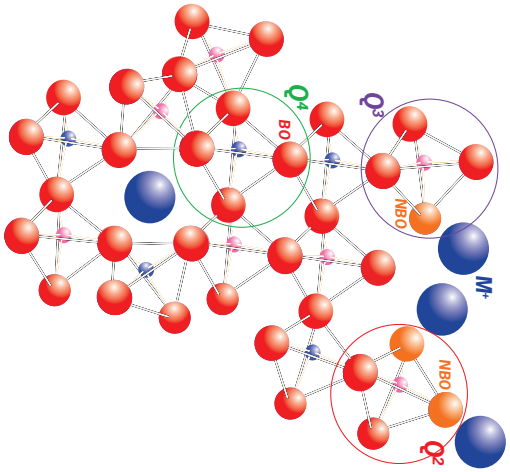
Daniel R. Neuville[a]

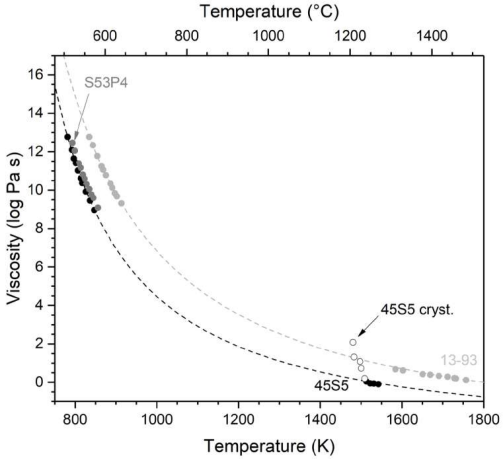
Tous les éléments et toutes les liaisons chimiques:
- covalentes
- ioniques
- métalliques
- Van der Waal's
- Hydrogène

=> Verre d'oxydes, de chalcogènures, métalliques, d'halures, organiques et toutes les combinaisons possible




~ Frequency, cm-1
1200-1150
1100
1050
950
900-880
Q4
Q3
Q2
Q1
Q0
Qn, %
M2O, mol%


Q4
BO
Q3
NBO
M+
NBO
Q2


Temperature (°C)
S53P4
Viscosity (log Pa s)
45S5 cryst.
13-93
45S5
Temperature (K)