PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino

Disponibilità a contribuire al progetto generale

(in attesa dei campioni)

- Caratterizzazione chimico-fisica-mineralogica della fibra selezionata (crisotilo russo) per raccolta parametri modello FPTI e classificazione *(per quanto di nostra competenza)*

- Raccolta dati sperimentali e classificazione dei tre campioni classati secondo il modello FPTI

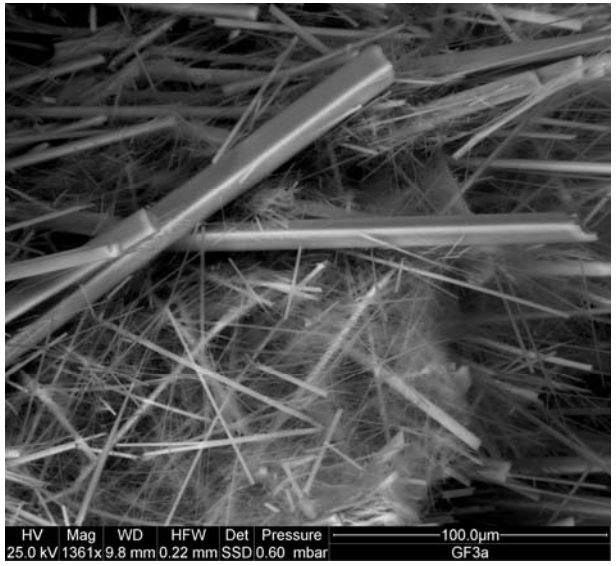
PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

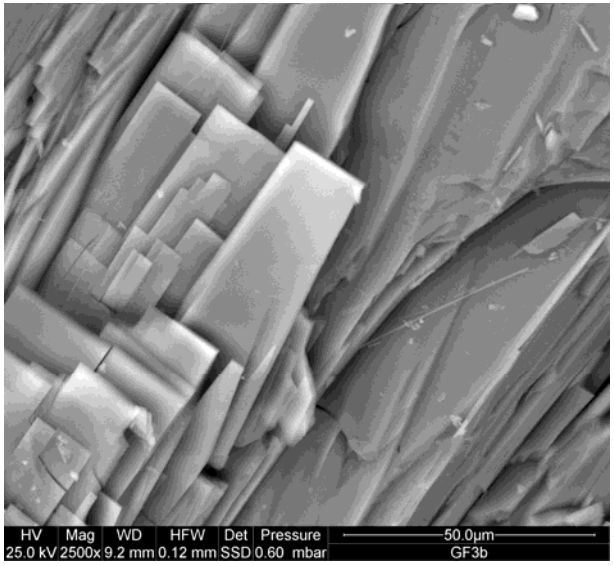
Unità di Urbino - **sottoprogetti unità locale**

1. **Caratterizzazione chimico-fisica-mineralogica di zeoliti fibrose: mesolite-thomsonite-erionite**

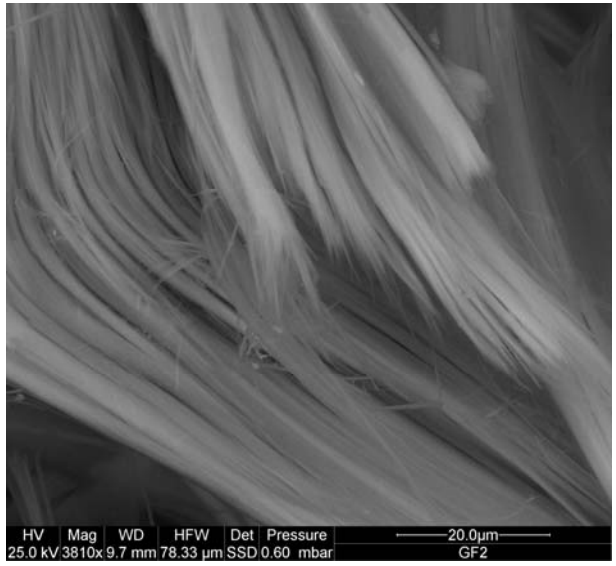
   Dati già acquisiti: morfologia e morfometria



GF3a - Mesolite



GF3b - Thomsonite



GF2 - Erionite

PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

1. Caratterizzazione chimico-fisica-mineralogica di zeoliti fibrose: mesolite-thomsonite-erionite

Dati già acquisiti:
Composizione chimica
EMPA e SEM
(in collaborazione con Paolo Ballirano UniRoma1)

	Mesolite		Thomsonite		Erionite	
	EMPA	SEM	EMPA	SEM	EMPA	SEM
SiO_2	46.29(32)	45.30(51)	40.95(61)	39.94(76)	59.55(82)	58.57(15)
Al_2O_3	25.20(22)	26.23(34)	28.28(39)	29.53(47)	16.79(28)	17.86(10)
CaO	9.68(12)	11.17(15)	11.47(32)	12.71(218)	3.45(12)	3.10(5)
MgO	0	0	0	0	1.73(4)	1.71(11)
K_2O	0	0	0	0	3.43(5)	3.46(5)
Na_2O	5.11(9)	3.23(74)	5.14(22)	3.37(152)	1.28(39)	1.13(4)
H_2O*	14.06(50)	14.06(0)	14.45(69)	14.45(0)	14.15(82)	14.15(0)
Total	100.34	100.00	100.29	100.00	100.38	100.00
Si	73.08(24)	71.28(12)	22.04(24)	21.36(26)	27.01(7)	26.47
Al	46.92(24)	48.72(12)	17.96(24)	18.64(26)	8.99(7)	9.53
Ca	16.40(16)	18.88(21)	6.62(20)	7.30(132)	1.68(4)	1.50
Mg	0	0	0	0	1.17(3)	1.16
K	0	0	0	0	1.99(2)	2.00
Na	15.64(28)	9.88(22)	5.36(20)	3.48(154)	1.14(36)	0.99
H_2O	74.2(31)	73.96(88)	26.00(146)	25.84(32)	21.47(156)	21.37
O	240.76(12)	239.44(43)	80.32(6)	79.72(62)	71.91(17)	71.39
R	0.609(2)	0.594(1)	0.551(6)	0.534(6)	0.750(2)	0.735
M/(M+D)	0.489(6)	0.34(7)	0.448(16)	0.32(13)	0.52(3)	0.53
E%	-3.10	2.70	-3.48	3.40	2.07	14.6

PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

1. Caratterizzazione chimico-fisica-mineralogica di zeoliti fibrose: mesolite-thomsonite-erionite

Dati già acquisiti: XRPD con raffinamento strutturale

(in collaborazione con Paolo Ballirano - UniRoma1)

	Mesolite	Thomsonite	Erionite
R_{Bragg} (%)	0.44	1.15	1.03
R_P (%)	1.38	1.95	2.20
R_{WP} (%)	1.85	2.60	3.23
Space group	Fdd2	Pcnn	$P6_3/mmc$
a (Å)	18.41604(16)	13.06918(15)	13.2792(3)
b (Å)	56.6812(5)	13.08398(15)	= a
c (Å)	6.54882(6)	13.19143(12)	15.0798(4)
Vol. ($Å^3$)	6835.94(11)	2255.69(4)	2302.87(11)

PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

1. Caratterizzazione chimico-fisica-mineralogica di zeoliti fibrose: mesolite-thomsonite-erionite

Dati già acquisiti: XRPD con raffinamento strutturale

(in collaborazione con Paolo Ballirano - UniRoma1)

	Mesolite		
	s.s. from ref.	partition from ref.	EF cations EMPA
Na1	182.6(13)	$Ca_{0.736}$ $Na_{15.264}$	
Ca1	294.1(11)	$Ca_{13.088}$ $Na_{2.912}$	
Tot.	477(2)	$Ca_{13.824}$ $Na_{18.176}$	$Ca_{16.40(16)}$ $Na_{15.64(28)}$
	Thomsonite		
	s.s. from ref.	partition from ref.	EF cations EMPA
Na1	113.3(4)	$Ca_{2.808}$ $Na_{5.192}$	
Ca1	77.4(3)	$Ca_{3.708}$ $Na_{0.292}$	
Tot.	190.7(7)	$Ca_{6.516}$ $Na_{5.484}$	$Ca_{6.62(20)}$ $Na_{5.36(20)}$
	Erionite		
	s.s. from ref.	partition from ref.	EF cations EMPA
Ca1	38.3(15)	$Mg_{1.170}$ $Na_{2.205}$	
Ca2	19.7(10)	$Ca_{0.645}$ $Na_{0.618}$	
Ca3	20.7(14)	$Ca_{1.035}$	
K1	38.0(0)	$K_{2.00}$	
Tot.	117(4)	$Ca_{1.680}$ $Mg_{1.170}$ $K_{2.000}$ $Na_{2.823}$	$Ca_{1.68(4)}$ $Mg_{1.17(3)}$ $K_{1.99(2)}$ $Na_{1.14(36)}$

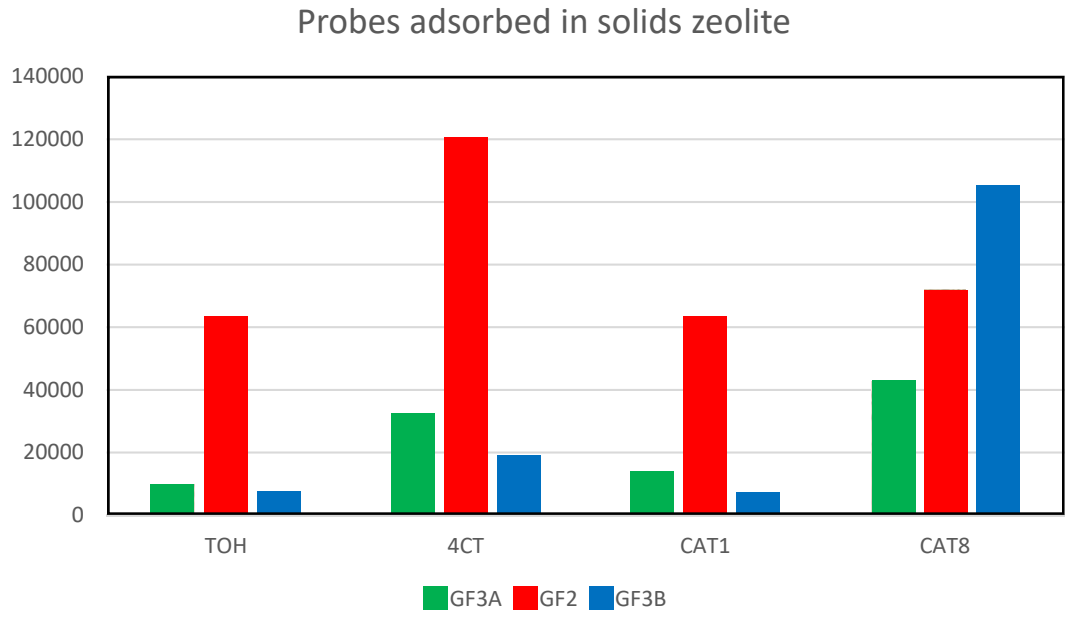
PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

1. **Caratterizzazione chimico-fisica-mineralogica di zeoliti fibrose: mesolite-thomsonite-erionite**

   Dati già acquisiti: EPR con 4 tipi di sonde (CAT1, TOH, 4CT, CAT8)



PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

1. **Caratterizzazione chimico-fisica-mineralogica di zeoliti fibrose: mesolite-thomsonite-erionite**

   Dati da integrare:

   - Fiber density and aerodinamic diameter
   - Zeta potential
   - Biodurability
   - BET e BJH (pore size and volume analysis)

PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

2. Effetti di cito-tossicità in vitro di zeoliti fibrose: mesolite-thomsonite-erionite

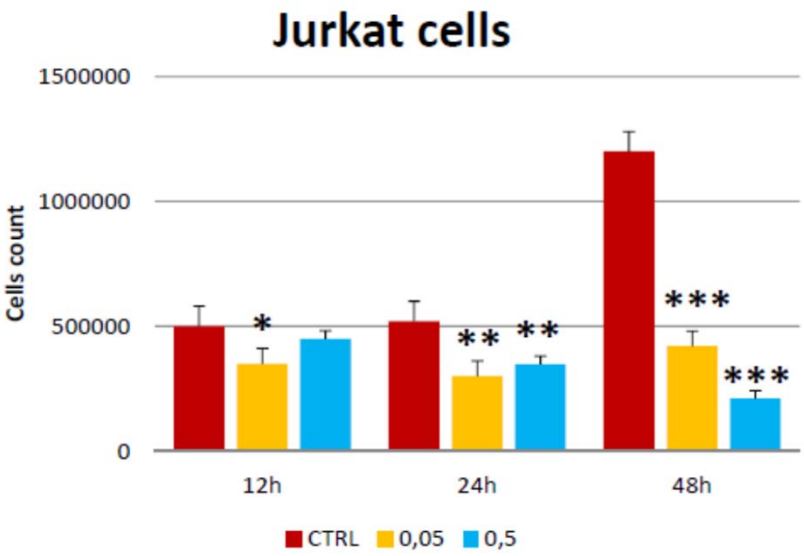
Suspension & Adherent Cell Culture (Jurkat and HT-22)

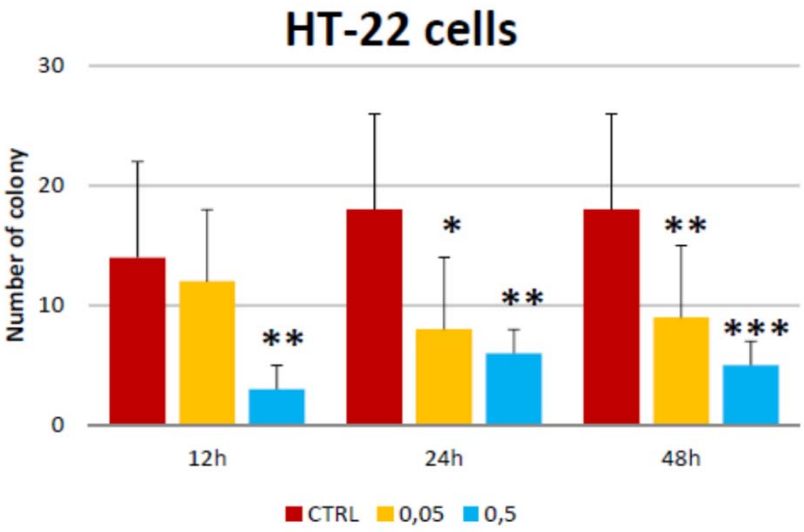
Jurkat cells are an immortalized line of human T lymphocyte cells. Their primary use is to determine the mechanism of differential susceptibility of cancers to drugs and radiation. Round cells growing singly or in clumps in suspension. Doubling time is about 25-35

HT-22 is an immortalized mouse hippocampal cell line and their primary use is a valuable cell model for studies of toxicity in neuronal cells. Adherent cells growing singly. Doubling time is about 22 hours.

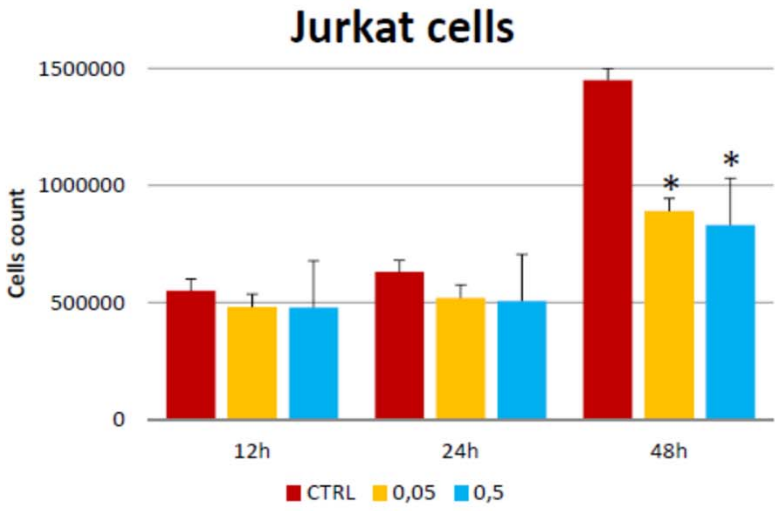
Cells treatment was carried out using 3 different concentrations (5, 0,5 and 0,05 mg/mL) for 3 different incubation times (12, 24 and 48h), according to literature.

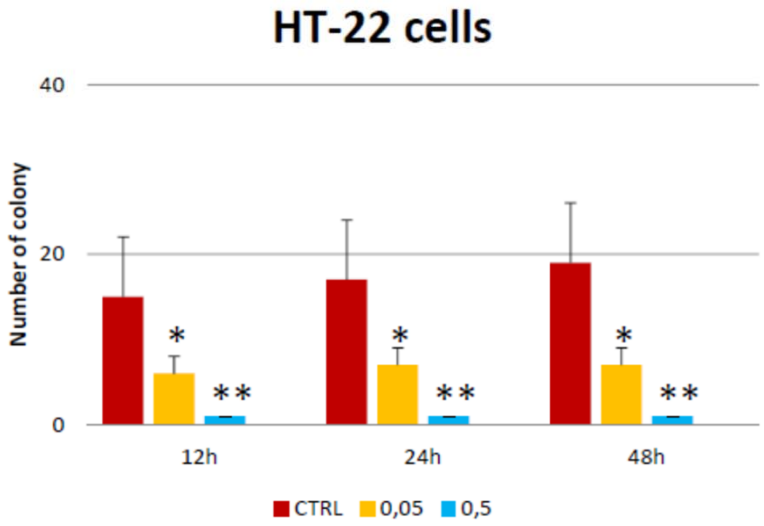
Fibrous erionite (GF2)



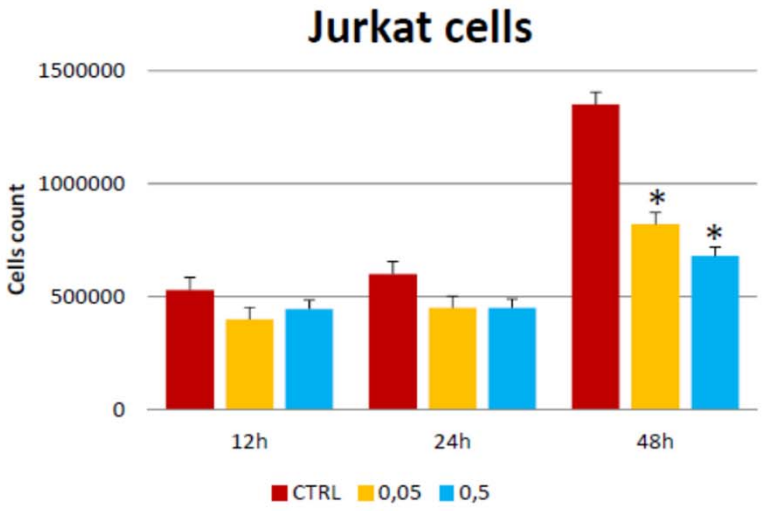


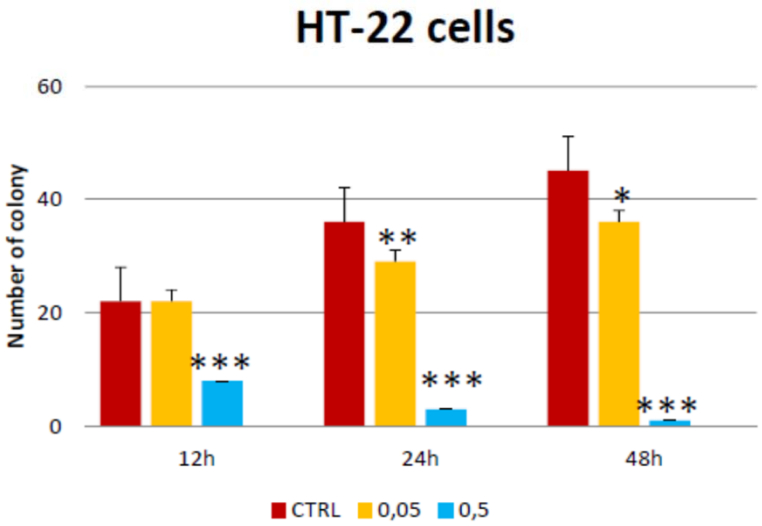
Mesolite (GF3A)





Thomsonite (GF3B)





PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

3. Caratterizzazione di nuovi campioni di zeoliti fibrose

Mordenite (Lessini)

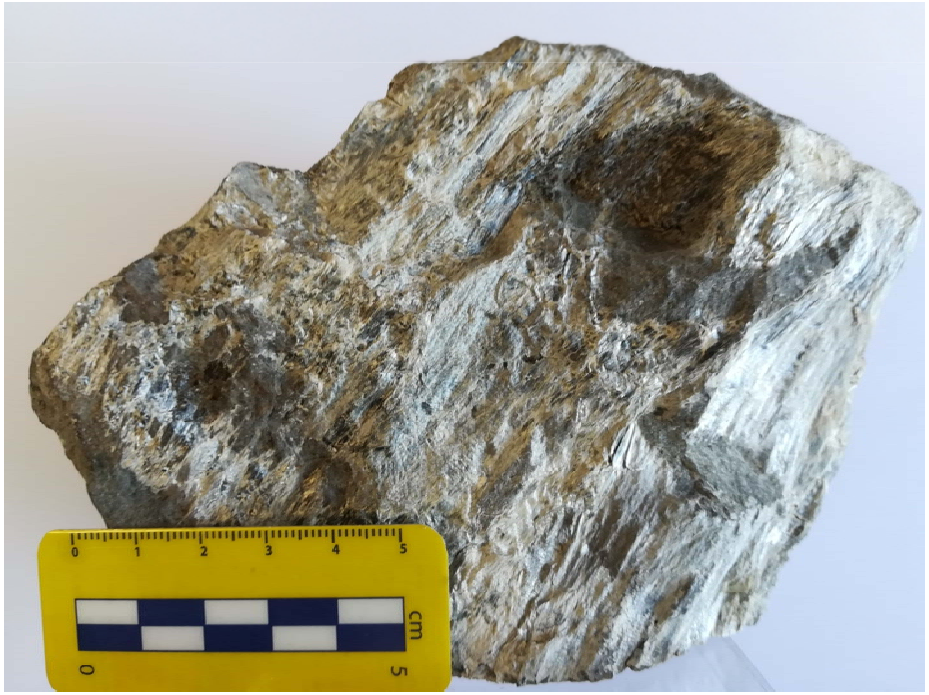
Mg-ferrierite (Lessini)

PRIN 2017

FIBRES:
a multidisciplinary mineralogical, crystal-chemical and biological project to amend the paradigm of toxicity and cancerogenicity of mineral fibres

Unità di Urbino - **sottoprogetti unità locale**

3. Caratterizzazione di nuovi campioni di anfiboli fibrosi



Asbeferrite (Mn-grunerite), Svezia)

Glaucofane (Alpi)